A GENRE ANALYSIS OF THE INTRODUCTION SECTION OF COMPUTER SCIENCE RESEARCH ARTICLES BY MALAYSIAN RESEARCHERS

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Abstrak

Bahagian pengenalan dalam artikel penyelidikan sangat penting dalam menetukan sama ada artikel itu akan diterbitkan ataupun tidak. Penulis bukan asli dilaporkan mengalami masalah menstruktur strategi retorik dalam bahagian pengenalan. Walau pun terdapat model retorik untuk penulisan, artikel penyelidikan dalam bidang berbeza mempunyai struktur dan gaya rhetoric yang berbeza. Maka, strategi retorik dalam bahagian pengenalan artikel penyelidikan untuk penulis bukan asli dalam bidang Sains Komputer perlu diterokai. Kajian kualitatif ini telah meninjau gerakan 'moves' dan langkah 'steps' di dalam 150 artikel penyelidikan Komputer Sains yang ditulis oleh ahli akademik Malaysia dan diindeks oleh Scopus. Kajian ini juga menganalisis sejauh mana penulis akur kepada model Pengwujudan Ruang Penyelidikan (CARS) dalam penulisan bahagian pengenalan. Analisis gerakan menggunakan model CARS telah digunakan untuk mengenal pasti struktur retorik korpus manakala temu bual berstruktur secara bersemuka dilaksanakan untuk memahami perspektif penulis dalam penggunaan strategi retorik. Dapatan kajian menunjukkan bahawa pembentangan soalan kajian atau hipotesis tidak digunakan oleh penulis bukan asli. Lima 'langkah' kurang digunakan, iaitu Penyataan lompang kajian, Pengumuman kajian secara deskriptif atau bertujuan, Pengumuman dapatan utama kajian, Penyataan kepentingan kajian, dan Menggariskan struktur artikel. Dapatan kajian juga menunjukkan bahawa 12 gerakan dan langkah perlu dimasukkan ke dalam bahagian pengenalan artikel Sains Komputer. Kajian ini menyumbang kepada literatur dalam penulisan artikel Sains Komputer berindeks Scopus dalam kalangan penulis bukan asli. Kajian juga telah menghasilkan satu garis panduan yang boleh digunakan oleh penulis bukan asli dan pengajar bahasa dalam pengajaran dan pembelajaran penulisan artikel penyelidikan.

Kata kunci: Artikel penyelidikan Sains Komputer, Analisis 'move', Analisis 'genre', penulis bukan asli, model CARS

Abstract

Research article introduction is crucial in determining the chances for publication. Non – native English writers have been reported to face difficulties in structuring rhetorical strategies in the introduction section. Although rhetorical models in writing are available, research articles of different disciplines vary in rhetorical structure and style. Therefore, there is a need to explore the rhetorical strategies in the Introduction sections for non-native writers in Computer Science discipline. This qualitative study explored the moves and steps in 150 Scopus indexed Computer Science research articles written by Malaysian academicians. It also examined the extent to which the writers conformed to Create a Research Space (CARS) model when writing the introduction sections. Move analysis using CARS model was employed to identify the rhetorical structures of the corpus while face-to-face semi- structured interviews were conducted to understand the use of rhetorical strategies through the perspectives of the writers. The findings show that Presenting research questions or hypothesis was not applied by the non-native writers. Five steps were underutilized, namely indicating a gap, Announcing present research descriptively or purposively, Announcing principle outcomes, Stating the value of the present research, and Outlining the structure of the paper. The findings also show that 12 moves and steps need to be included in the introduction section of Computer Science articles. This study contributes to the existing literature on the writing of Scopus indexed Computer Science articles by non-native writers. The study also produced a set of guidelines that can be used by non - native writers and language instructors in the teaching and learning of research article writing.

Keywords: Computer Science research article, Move analysis, Genre analysis, Non-native writers, CARS model

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The issue of publish or perish among academicians has long been debated (Jusoff & Samah, 2010; Zakaria & Rowland, 2006). Globally, academicians in the role as researchers are expected to write research articles and the articles must be disseminated through publication especially in scholarly journals of some repute (Borgman, 1993). In the US, Japan and the UK, technical writers help their researchers to write faster and more effectively, thus giving them more time and energy to focus on the research substance and quality (Slattery, 2007).

In Malaysia, academicians who also play the role of researchers, publish research articles for various reasons such as for career advancement (Jusoff & Samah, 2010), sharing knowledge (Davarpanah, 2009), securing research funding, for prestige (Maidin, 2010), research funders who require publications (Roosfa &Yahya, 2011; Zakaria & Rowland, 2006;) and for keeping up with the performance measures (Rahayu, Norazan, Az'lina, Adriana, Nornadiah & Naslina, 2013). Publication is also the Key Performance Indicator for Research Universities (Jusoff and Samah, 2010; Maidin, Yusof, Ibrahim, Rohani & Hosaini, 2010). Given that Malaysia aspires to have two of its national universities ranked among the world's best universities with one of them listed among the Top 50 (Department of Higher Education, 2012), the expectations on publications by academicians has escalated to a high index and impacted publications (Roosfa & Yahya, 2011).

Indeed, the drive to increase the number of publications by Malaysian academicians has grown more demanding in the past few decades not only from publishers' and editorial perspectives (Zakaria & Rowland, 2006) but also from the Ministry through various directives (Jusoff, Zaini and Siti, 2009; Department of Higher Education, 2012; Masron, Ahmad & Rahim, 2012; Singh, Thuraisingam, Nair & David, 2013). Therefore, a larger number of publications is needed in order for Malaysia to reach the global standard on "technology creation and innovation, research and innovation" (Jusoff, Zaini and Siti, 2009, p.31).

It was reported in 2013 that universities from South Korea, Hong Kong, Japan, Singapore, China and Taiwan had improved in their rankings but Malaysian universities ranking had dropped. The lack of quality research and citations which had accounted for more than 50% of the ranking criteria was identified as one of the major problems according to the Ministry of Education (Roosfa &Yahya, 2011; Singh, Thuraisingam, Nair & David, 2013, p.2). Masron, Ahmad & Rahim (2012) also highlighted the importance of publishing research articles in relation to fulfilling the university key performance indicator and ranking target. In short, the need to increase the number of research publications has become more prevailing and urgent.

On the whole, apart from the quantity, the quality of the research articles also needed to be increased. In fact this issue has also been pointed out from the 1970s to the present (Hatta, 2012; Jusoff, Zaini & Siti, 2009, Lim, 1975; Lim, 1992; Masron, Ahmad & Rahim 2012; Pang, 1996; Roosfa & Yahya, 2011; Singh, Thuraisingam, Nair & David, 2013; Zainab, 1997; Zakaria & Rowland, 2006). In 1975 and again a decade later in

1996, studies have highlighted the need to improve the quality of papers submitted to the local Science, Technology and Medical (STM) scholarly journals (Lim, 1975; Pang, 1996). In 1997, Zainab (1997, p.18) further added that Malaysian contributions in the fields of chemistry, biology, life and agriculture were "increasingly significant by Third World Standards". Later in 2011, quality research writing was identified as a challenging task not only for novice researchers but also for senior staff. There have been cases where, "professors are terminated based on the fact that they failed to achieve the university's Key Performance Index, which requires them to publish their works in high impact indexed journals" (Roosfa &Yahya, 2011, p.63). Similarly, Bakri and Willett (2011) also reported that their bibliometric study of Computer Science research articles indexed in Scopus and Web of Science found that both publication and citation rates to be low. The predicament of publishing in indexed journals which requires quality was also highlighted by Singh, Thuraisingam, Nair and David (2013, p.2) who claimed that "the poor performance of the public universities...resulted in Malaysian public higher education institutions coming under greater public scrutiny". To sum up, improvement in terms of number and quality of research articles are imperative, especially in achieving the national aspiration of better global rankings for Malaysian universities.

In order to increase the quality and quantity of research articles, researchers have to overcome many challenges and some of the ordeals listed are English language barrier (Arokiasamy, Ismail, Ahmad, & Othman, 2009; Singh, Thuraisingam, Nair & David, 2013), time constraint (Zakaria & Rowland, 2006) and cultural issues (Rakhmawati, 2013). In the 70s, Altbach (1978) drew attention to the problem of writing in English which was suffered by developing nations in many aspects which also led to major

implications for publishing. In addition, in the local context, Zakaria & Rowland, (2006) mentioned that language difficulties are another factor limiting publication, "to achieve publication in journals recognized by the Web of knowledge, whether international or local, scientists must write in English, of which some of them have only an imperfect command" (p.233-234). Moreover, the predicament of inadequate flair in English faced by the writers was expressed by Singh, Thuraisingam, Nair and David (2013, p.14) that "no matter however well they write, it was not the same as that of a native speaker". They asserted that it was unrealistic to expect a local who had studied in a *Sekolah Kebangsaan* to write like a native even if the writer had obtained his PhD from United Kingdom.

On top of the language problem, Lim (1992, p.36) suggests that one of the main delays in publication was the "time taken to prepare the manuscript". In addition, Zakaria & Rowland (2006, p.235) stress that "writing up work in the exact style and format required for a particular journal is seen as laborious and time consuming, and may be wasted effort if the paper is rejected". All in all, language and time are two restraining factors in research writing and if the researchers can be helped to write faster and more effectively, they can have more time and energy to focus on the research substance and quality (Slattery, 2007).

The predicaments faced by Malaysian writers are not surprising since many researchers (Butler, 2010; Flowerdew, 1999; Gross, 1990) have highlighted many more problems faced by non-native English writers who have attempted to publish research articles. The problems can be categorized into three aspects of lexicogrammar (Flowerdew, 1999; Koutsantoni, 2006; Rummel, 2005), discourse structure (Dong & Xue, 2010; Hyland, 1995; 2002; Shehzad, 2005, 2007, 2008, 2010) and cultural differences (Adnan, 2009;

Kanoksilapatham, 2007; Yaghoubi-Notash & Tarlani-Aliabadi, 2012;). Among the three aspects of lexicogrammar, discourse and cultural differences explained, the researchers concurred that the lexicogrammar area was less problematic compared to the other areas (Butler, 2010, Duncan, 2008; Flowerdew, 1999; Nakakoji, Yamamoto, Akaishi & Horis, 2005). Such a view has been echoed by a few other researchers who reported that rhetorical structure in the research articles written by non-natives as one of the more challenging problems (Bhatia, 1993; Jefferey, Kieffer & Matsuda, 2012; Swales, 2004). These views were recapitulated by Swales (1990) who emphasized on the need for non-native English writers to be aware of discourse in the discipline and the rhetorical strategies that successful writers were practising. To further understand the problems that have been highlighted, this study intends to explore the problems further, specifically on the rhetorical strategies in research article writing by non-native English writers.

1.2 Problem Statement

The Introduction section is important because it is where the writers state the research questions or problems and "explain the importance of this problem to the field, summarize the research methods" and "summarize the results obtained" (O'Neil, 1997, p.12). Before discussing the methods and results of the study, the research must be situated appropriately in the discipline by establishing the research territory that the study "is significant and worth exploration" (Shehzad, 2010, p.15). Among the four sections which are Introduction, Methodology, Result and Discussion sections, researchers have concurred that the problematic sections in writing research articles are the Introduction and the Discussion sections (Flowerdew, 1999; Ibrahim & Nambiar, 2012; Pho, 2008). Swales and Najar (1987, p. 175) have stressed on "the complexity of the compositional

process at the introduction stage". Being the most difficult, the Introduction section is also critically important in determining the "chances for publication" (Adnan, 2009, p.111). Some of the rhetorical issues identified were "reviewing literature that situates the study among other studies" (Adnan, 2009, p.111), "Establishing territory- Claiming centrality" and "Establishing a niche- Counter claiming" (Posteguillo, 1999, p.143). While many studies have been done on research article introductions, little is known about the introduction sections written by non-native writers particularly the Malaysian writers (Ahmad, 1990). Thus, further investigation in this area is needed.

Despite the importance and complexity of writing the Introduction section, previous studies have highlighted other issues in relation to the Introduction section such as limitations and applicability of the existing models as pedagogical tools, the variation in the rhetorical strategies used in different disciplines and cultures.

While there are many existing models that can be used as guidance for researchers to write research articles, educators have been alerted on the applicability and limitation in using these models as pedagogic tools particularly for different disciplines (Anthony 1999; Shehzad, 2012). Some of the models on research writing are the Yang and Allison's Seven-Move model (Noudoshan, 2012), the CARS model (Swales, 1990, 2004), the Move Model by Hopkins and Dudley-Evans (Holmes, 2013) and the Move Model by Nwogu 1997 (Malik & Nesi, 2008). Despite the availability of these models, the understanding on how to use these models as pedagogic tools in various disciplines is still needed

(Anthony, 1999). Shehzad (2012) concurs with Anthony (1999) that "one rhetorical model for all disciplines is not advisable" because research articles of different disciplines vary in structure and style and therefore, the same rhetorical strategy may not be adapted. Anthony (1999, p.45) pointed out the need to study the model in pedagogic application because "the danger, of course is that many teachers of technical writing, coming from backgrounds unrelated to the target discipline, will be unable to correctly interpret the model and inevitably use it as it is." He illustrates the problem with the case in Japan where language instructors with literature backgrounds were assigned to teach technical writing courses to scientists and engineers; using textbook that uses CARS model, but it does not address the interpretation issues and often treated the differences simply as exceptions to the rule. Anthony (1999) highlighted the issue of which the exceptions to the rules which may be in fact the standard practice of a certain disciplines. Relative to using the existing model as a pedagogic tool, the applicability and limitation of the models particularly in different disciplines must be understood.

While the variation of rhetorical strategies used by the Computer Science research writers to follow the CARS model has been pointed out by Anthony (1999) and Shehzad (2012), the applicability and limitation of the model as a pedagogical tool for non-native writers need more exploration because the past studies were on research articles written by writers regardless of their nationality. However, studies on research articles written by non-native English

writers have been found to use different rhetorical strategies such as the studies on Indonesian writers (Adnan, 2005), Turkish writers (Karahan, 2012) and Spanish writers (Sheldon, 2011). Flowerdew (1999) has stressed the issue of encouraging the non-native English writers to publish in international English publications and the importance of conducting research at micro level, especially in terms of individual linguistic and cultural backgrounds because circumstances may vary greatly. Although studies on non-native English writers found them using different rhetorical strategies than native writers (Adnan, 2005; Karahan, 2012; Sheldon, 2012) analysis on how the Malaysian writers use the rhetorical strategies suggested in the existing model such as CARS model (Swales, 2004) is yet to be discovered. There are limited studies that describe how the academicians in Malaysian universities write the research articles (Ahmad, 1997) thus, giving little reference for the teachers to fall back to in establishing an understanding on how the Malaysian writers actually write. Such understanding is important as it enables the teachers to gauge on the Malaysian learners' writing needs.

The shortcomings on the applicability and limitation of the existing models as a pedagogical tool, as well as the limited studies on how the models are being used by the Malaysian researchers show the lack of understanding on how they use the rhetorical strategies in publications. The understanding of how Malaysian writers utilized the rhetorical strategies in a specific fields is necessary to construct the schemata needed by both the learners and the

language instructors in the Malaysian context. Schemas refers to the frame or the background knowledge that exists in the brain of an individual which creates a sort of bias inherent in the mind; a schema is a lens that both shapes and is shaped by experience (McVee, Dunsmore and Gavelek, 2005). The learners' schemata, particularly on the pattern and background knowledge are important in learning as the schemata give an understanding of how knowledge is to be organized (Heo, Han, Koch & Aydin, 2011); likewise the schemata of the language instructors are just as important. Schemata on the target publication enable the language instructors to employ the model as a pedagogical tool in teaching to arouse learners' interest, to reduce difficulties in learning and to build confidence in the new skill acquired. Given Anthony's (1999) caution of the applicability and limitations of the models as pedagogic tools in teaching, a description on how Malaysian writers utilize the rhetorical strategy is needed to form the schemata that would benefit both the language instructors and the learners.

In short, there are existing models that can be used as guidance for researchers, however, for pedagogic application, the applicability and limitation of these models must be understood. As such, understanding the applicability and limitation of the existing model in real practice and understanding how the particular discourse community fits the model need to be studied and described.

Even though introduction section of research articles between disciplines appears to be similar to the readers, studies have also shown that writers from different disciplines employed different strategy moves (Habibi, 2008; Nwogu, 1997, Samraj, 2002). Studies have been made on the rhetorical moves in research articles in various disciplines such as on Wildlife Behavior and Conservation Biology (Samraj, 2002), Physics and Educational Psychology (Swales & Najjar; 1987), Medicine (Nwogu, 1997), Computer Science (Posteguillo, 1999), Language (Habibi, 2008), Biochemistry (Kanoksilapatham, 2005), Business Management (Lim, 2006), Biomedical (Kanoksilapatham, 2010), Agricultural Sciences (Rubio, 2011); findings from these studies showed that writers from different disciplines employed different strategic moves.

Briones (2012) pointed out the non-prevalent use of "indicating the research gap" move in Philosophy research articles. Some disciplines utilized a certain move more than other disciplines (Kanoksilapatham, 2005; 2010; Samraj 2002) and some disciplines avoided using a certain strategy altogether (Habibi, 2008). For example, "indicating the research gap" step has been reported to be non-prevalent in Philosophy (Briones, 2012) however, this move is reported to be utilized by 95% of the computer science research articles introduction (Shehzad, 2012). Apart from that, comparison on the cyclical move for "reviewing items of the previous research" between Computer Science (Posteguillo, 1999) and Biochemistry done by Kanoksilapatham (2005) also shows differences in different disciplines. Biochemistry research article introductions were found to

have more cyclical occurrence of "reviewing items of the previous research" whereas the Computer Science research articles seldom attempted this move and this could be attributed to the relatively short history of Computer Science (Kanoksilapatham, 1999). Other studies also reported on different practices in the sub-disciplines. Habibi (2008) reported that while "indicating the research gap" has been realized in all of the English Special Purpose research article introductions, only 53% of the Psycholinguistics and 38% of the Sociolinguistics research article introductions attempted this step. Apart from the differences between Language sub-disciplines, differences between Biology sub-disciplines were also pointed out by Samraj (2002). The study reported that the step of "claiming centrality" was used more in research articles of Conservation Biology compared to those of Wildlife Behaviour.

In short, even when the Introduction section of research articles between disciplines appears to be similar to the readers, studies have shown that writers from different disciplines employed different strategic moves. With regards to the dissimilar practices between disciplines, knowing the practices in the target discourse community would benefit the learners and the language instructors.

As such, it is necessary to focus on a specific discipline. Therefore, this study focuses on the Computer Science discipline because the field is new compared to the other sciences (Shehzad, 2006, 2007). Shehzad (2007, p.28) argued that "Computer Science, has hardly fifty years of tradition and development whereas many traditional disciplines such as medicine and physics have a long history of

evolution…It was not until the 1990s that comparative work on Computer Science writing started" (Shehzad, 2006, p. 225) and because it is a new discipline, studies on Computer Science discipline are scarce and this limitation has been highlighted by the researchers (Johnson & Rozycki, 2010; Shehzad, 2006). Shehzad (2006, p.225) pointed out that "as compared to the linguistic investigation carried out in other sciences, the linguistic analysis of Computer Science discourse has been limited". Johnson and Rozycki, (2010, p.90) also highlighted the limited investigation in this discipline. Although Shehzad (2007) found a wider use of the pronoun "we" in Computer Science discourse, there has been little research done on the use of discourse in Computer Science research writing.

This study focuses on the Computer Science discipline because the field is new compared to the other sciences (Shehzad, 2006, 2007). Shehzad (2007, p.28) argued that "Computer Science, has hardly fifty years of tradition and development whereas many traditional disciplines such as medicine and physics have a long history of evolution... It was not until the 1990s that comparative work on Computer Science writing started" (Shehzad, 2006, p. 225) and because it is a new discipline, studies on Computer Science discipline are scarce and this limitation has been highlighted by the researchers (Johnson & Rozycki, 2010; Shehzad, 2006). Shehzad (2006, p.225) pointed out that "as compared to the linguistic investigation carried out in other sciences, the linguistic analysis of Computer Science discourse has been limited". Johnson and Rozycki, (2010, p.90) also highlighted the limited investigation in this discipline. Although

Shehzad (2007) found a wider use of the pronoun "we" in Computer Science discourse, there has been little research done on the use of discourse in Computer Science research writing.

Apart from the variations in the discipline, another problem of the study is linked to cultural variations that have been highlighted in many studies (Adnan, 2009; Vasconcelos 2007; Soler-Monreal, Carbonell-Olivares and Gil-Salom, 2011; Swales and Najar, 1987; Yaghoubi-Notash & Tarlani-Aliabadi, 2012; Zand-Vakili and Kashani, 2012). These studies have shown that non-native English writers used different rhetorical strategies than the native writers, even when they wrote in the same genre.

Studies on research articles by Thai writers (Jogthong, 2001; Kanoksilapatham, 2007; Supatranont, 2012) reported the lack of critique culture which was expected in the western academia. The absence of critic strategy is not confined just to the Thai writers as studies have shown that the problem also has some bearing on the other groups of non-native English writers (Hirano, 2009; Ionin, Montrul & Santos, 2011; Sheldon, 2011), English research articles by Spanish writers (Ionin, Montrul & Santos, 2011; Sheldon, 2011) and research articles in Brazillian-Portugues (Hirano, 2009). Resistance to this strategy is attributed to the small size of the discourse community where writers are most likely to know each other (Sheldon, 2011) and "invoke a negative attitude from other researchers" (Hirano, 2009, p. 245). While the research articles in the Malay language have been examined to show a similar trait (Ahmad, 1990), the utilization of this strategy amongst Computer Science academicians in Malaysian universities in the research article remains unclear.

Studies have shown that non-native English writer cultures do influence the choice of rhetorical strategies used in the English research article writings. Kourilova (1998, p.112) reported that Slovak writers of English research articles were "frequently accused of being pretentious, overconfident, and unjustifiably conclusive" when actually the problems lie in the cultural differences which are rendered by the non-native English writers' failure to recognize the English modality and pragmatics which were important to project honesty, modesty, caution, and politeness. The findings indicated that different cultures may lead to different rhetorical strategy (Hirano, 2009; Ionin, Montrul & Santos, 2011; Sheldon, 2011). Given that Malaysian culture is distinctive in many ways compared to the Thai, Indonesian, Spanish, Brazilian and Slovak mentioned in the earlier studies, there is a significant need to investigate the Malaysian context.

The next problem faced by non-native English research article writers is the absence of expected rhetorical strategies. The model by Swales (1990, 2004) theorized that in writing research article introductions, writers commonly position their study in the Introduction section using three moves, which are; "Establishing a territory", "Establishing a niche" and finally "Presenting the present work". These moves are realized using a few identified steps, notably by using citation which is indicated as a required strategy in both of Swales' models (1990, 2004). Citation was found to occur in all research articles by native writers; however non-native English research articles, specifically written by Indonesians, deviated from this norm (Safnil, 2000; Mirahayuni, 2002; Adnan, 2009). Only half of the non-native English research articles were found to use this step (Mirahayuni, 2002). The majority were found to use fewer references and

used this step less frequently than the native writers (Adnan, 2009). Such deviation compromises the rhetorical goal of this step which is to establish solid arguments and the relationship between the present study and the research context highlighted by Swales (1990). The studies (Safnil, 2000; Mirahayuni, 2002; Adnan, 2009) were about Indonesian writers who share the same border, culture, climate, food and exposure with Malaysians. Even though the two neighbouring countries speak almost similar languages and share many similar cultures, the finding of the studies could not explain if such lacking is also happening amongst the Malaysian writers; hence opening a research space for more studies.

Apart from the limited review of literature, studies also found that the critical review of previous research as one of the least popular strategies among non-native English writers (Safnil, 2000; Kanoksilapatham, 2007; Zand-Vakili and Kashani, 2012). Thai writers (Kanoksilapatham, 2007; Supatranont, 2012), Indonesian writers (Safnil, 2000), Arabic research article writers (Fakhri, 2004), Brazillian-Portugese research article writers (Hirano, 2009), Spanish writers (Sheldon, 2011) Persian research article writers (Zand-Vakili and Kashani, 2012; Talebinezhad, Arhabi, Taki & Akhlaghi, 2012), Chinese writers (Du, 2004) rarely make critical remarks on the work of previous researchers which are inconsistent to the Swales model that posits this move as part of the strategy to "establish the research niche" (Swales, 1990). Ahmad (1990) also found such scarcity in the research articles of the Malaysian writers. Holmes and Asmahan (2002) found that the step is also completely absent from the Malay-English texts and the non-Malay texts. However, further research is needed as the studies (Ahmad, 1990; Holmes and Asmahan,

2002) were done respectively 24 and 12 years ago, so it is unclear if the scarcity in the writing is still significant.

To add to those absences of rhetorical moves, research articles by non-native English writers were also reported to have very infrequent use of another rhetorical strategy, which is "announcing the principle findings". Announcing the principle findings is a strategy that is not only common in English research articles but also becoming a trend in 55% of research article introductions from the findings of studies in 1987 (Swales and Najar, 1987), 70% in 1999 (Pesteguillo,1999) and 73% in 2010 (Shehzad, 2010b). Holmes and Asmahan (2002, p.14) found a significant difference between the Malaysian and the Australian texts where the Malaysians were reported to have used more sentences for the move of "Announcing Results". However, the study focused on the Abstract section not on the Introduction section. Given the importance of the Introduction section, which is also the most problematic section in writing research articles (Flowerdew, 1999; Ahmad, 1997; Adnan, 2005; Ibrahim & Nambiar, 2012; Swales & Najar, 1987), further examination on "Announcing Results" specifically in the Introduction section by Malaysian writers is needed.

All in all, in relation to the suggestions that non-native English writers used different rhetorical strategies than native English writers (Safnil, 2000; Kanoksilapatham, 2007; Zand-Vakili & Kashani 2012) attempts have been made to teach the move strategies to the writers (Flowerdew, 2000; Ibrahim & Nambiar, 2012). Notably, Swales (1990, p.89) highlighted that understanding the "rationale and conventions" of the common research article introduction

would help the non-native English writers to write "texts that sufficiently match the reader's formal schemata". However, Swales move models have been "deemed to be partial to Anglo-American writing" and therefore in the application of teaching using the models, the "intercultural rhetorics" must be taken into consideration for classroom application (Ibrahim & Nambiar, 2013, p. 439).

Ibrahim & Nambiar (2013) examined the use of the CARS model (Swales, 2004) in teaching research article writing to non-native English writers and commented that direct intervention via genre analysis was needed. Findings from a previous study (Hatim, 1997 as in Ibrahim & Nambiar, 2013) on "intercultural rhetoric" which describe how Arab students write have added valuable considerations that make the intervention more meaningful. Concisely, the importance of intercultural rhetoric in applying the western- counter argument was highly recommended. Even though the study by Ibrahim and Nambiar (2013) is affiliated with a Malaysian university, the study was for Arabs writers. In order to conduct a similar lesson for Malaysian writers, the "intercultural rhetoric" of the Malaysian writers needs to be established. Therefore, the study on the move and steps used in the research articles written by Malaysian writers is needed to provide the needed rhetorical strategy descriptions. For that reason, this study attempts to add to the gap by examining the moves and steps used in the research articles written by the academicians in Malaysian universities, particularly in the Computer Science discipline.

In the Malaysian context problems that surfaced from cultural variation have been studied by UmulKhair Ahmad (1997) who analyzed the research article introduction by Malaysian writers using the CARS model but unlike this proposed study, her study was focused on the research article written in the Malay language and the CARS model used was the 1990 version. Her study has highlighted the cultural inclination that has resonated in the writing of research articles in Malay by Malaysian writers. Amongst the problems were the lack of emphasis on "relationship between the solution and announced purpose" (1997, p.184), lack of critical view on past research such as "rarely pose challenges to other's work" and "lack of self-promotion presented in the introduction" (1997, p.182). Whether the problems discovered in the study on Malay research articles persist in English research articles written by Malaysians or not can only be confirmed by studying the English research articles written by the academicians in Malaysian universities.

In the Malaysian context, apart from the study on Malay research articles by Ahmad (1990), Holmes & Asmahan (2002) investigated the research articles written by Malaysian writers. They examined 100 conference abstracts which were submitted to a teacher conference held at Universiti Teknologi Malaysia. The abstracts were a mixed group of Malay and English abstracts written by Malaysians, and English abstracts written by Australian writers. The findings of the study showed that the Australian abstracts contained fewer sentences than the abstracts written by the Malaysian writers. Similar to the finding by Ahmad (1990), the absence of "indicating a gap" was also detected in the Malay abstracts. Significantly, the absence was also detected in the English abstracts written by the Malaysians. Holmes and Asmahan suggested that this avoidance

was transferred to the English texts. While these two studies have given a good description on the use of the rhetorical strategies in scholarly writing by academicians in Malaysian universities, neither of the studies focused on the Computer Science discipline like this study. Moreover, Holmes and Asmahan (2002) examined the Abstract section whereas this study examines the Introduction section.

In the Malaysian context, researchers affiliated with Malaysian Universities have also conducted a number of research article studies (Holmes, 2013; Lim, 2009, 2010, 2011, 2012b; Mello 2011; Shafiq & Sri, 2010). Holmes (2013) looked at the research articles on History, Political Science and Sociology, Lim (2009, 2010, 2011, 2012b) examined the research articles on Education and Applied Linguistics, and Management, and Mello investigated Hospital Management research articles. Even though the mentioned studies were conducted by researchers affiliated with Malaysian universities, these studies focused on the discipline variation without looking into the nativity of the writers. In view of the findings on cultural variation in many studies (Jogthong, 2001; Kanoksilapatham, 2007; Supatranont, 2012; Hirano, 2009; Ionin, Montrul & Santos, 2011; Sheldon, 2011); the studies (Holmes, 2013; Lim, 2009, 2010, 2011, 2012b; Mello, 2011; Shafiq & Sri, 2010) could not explain the rhetorical moves utilized by the Malaysian writers.

All in all, one may think that the differences in the introduction paragraph of different disciplines are negligible, however many researchers have highlighted

the importance of having a good introduction paragraph (Adnan, 2009; Flowerdew, 1999; Ibrahim & Nambiar, 2010; Shehzad, 2010). Thus, understanding these differences matters. Often, a research article is more than 6000 words in length and with technology; there are many articles available for reading; as such competition for readership is stiff. The Introduction section of the research articles often has an effect on the readers' interest whether the article "is significant and worth exploration" (Shehzad, 2010, p.15) and whether it is worthy enough for further reading. On top of this, the introduction section must not only appeal to common researchers but also to the reviewers, editors and grant panels. The Introduction section has been considered as very important in determining the "chances for publication" and "situates (ing) the study among other studies" (Adnan, 2009, p.111). In summary, even though the Introduction section of research articles between disciplines appears to be similar to the readers, understanding the practices in the target publication would benefit the learners and the language instructors because writers from different disciplines and culture employed different strategic moves.

Even though the selection of research articles from Scopus database suggested that the articles have been edited to conform to the international standard thus may not reveal much differences in the writing of the Malaysian writers; for pedagogical purpose, it is still necessary to obtain the empirical descriptions on the utilization of the moves and steps in the writing of the Malaysian writers in the target publication. For pedagogical purpose, this study is not to establish

differences between Malaysian and writers of other nationalities, but rather to establish understanding on the practices, particularly on the moves and steps that are popular among Malaysian writers and how the moves and steps are achieved in the target publication. Scopus is identified as the target publication because of the recognition given by the Malaysian Ministry of Higher education through directives communicated to the academicians on various occasions (JPT, 2010; Ministry of Higher Education 2011; Department of Higher Education, 2012). The recognition is evident in the initiatives run by various Malaysian universities which includes rewarding to the writers in form of 'seed money' or research grant with every Scopus article published (UniMAP 2011; UniMAP, 2012). Moreover, Scopus has also been recognized as an acceptable return of revenue for various research grants such as Fundamental Research Grant (FRGS) and Experimental Research Grant (ERGS). In short, many researchers target Scopus as the platform for their article publication. However, writing teachers who are not member of the profession have been warned that they are "not qualified to help students think and write like historians, engineers, agricultural or economist", instead writing teachers should look at "the writing demands" that the "students will face after they leave" and to consider how to "help to prepare them for those demands" (Leki, 1994, p. 82). Therefore, it is important to understand the demands of the target publication. In making preparation for the student to meet those demands, it is necessary to understand which moves and steps are being favoured and which are being underutilized by the Malaysian writers. The excerpts derived from analysis of how the moves and

steps have been achieved, provide real practice writing samples for the instructors and learners. While studying articles written by global writers may also give high standard examples, such sampling would not give information on which move and steps are being avoided by the Malaysian. Such information is important as identification on those being avoided indicates the challenging strategies and such challenge should addressed with more emphasis by the learners and the instructors. The description on the techniques of realizing the moves and steps provides the teachers and learners with perspectives on how the Malaysian researchers have advanced in fulfilling the global writing expectation. The excerpts from the Scopus articles provide samples on how these challenging moves and steps have been realized in the target publication and this would further help the teaching and learning. If the study uses articles from non-Scopus database, the samples derived from the non-Scopus articles may not be suitable learners who aimed to publish in Scopus indexed journal.

The selection of journal articles from Scopus give a picture that the articles are less problematic as the articles have conformed to the international standards and have been edited hence is less rich for problem investigation. However, this study focus on using Scopus research articles to provide writing technique samples and guidelines in using CARS model as pedagogic tool. This study describes the common and underutilized rhetorical strategies employed in the Scopus articles. For pedagogical purpose, rather than highlighting various mistakes in research articles in local journals or articles written that have not

been published, this study focus on the description because the description on the practice would help language teachers and learners understand the application and limitation of the existing CARS model in pedagogical context particularly for Malaysian. Language teachers have described that teaching post graduate or scientific researchers on how to write scientific articles as not only cumbersome but also requires a lot of convincing. By choosing Scopus articles, the description on the techniques to realize the moves and steps in the actual target publication can be derived. Authentic writing samples derived from the target publication which is Scopus, present convincing descriptions and provide accounts for the real practice. The explanations on strategies used, samples on techniques used in accomplishing the strategies, and cautions on underutilized strategies provide the teachers and the learners with perspectives on the way Malaysian researchers fulfil the global writing prescriptions. Identification of the techniques used by the players in the target publication is also supported with excerpts from the text which can be use as writing samples. While the writers may have conform to the international standard set by Scopus, descriptions on the extent of conformity and the techniques used to achieve conformity is necessary for pedagogical purpose. In short, rather than focusing on differences between Malaysian and writers from other nationalities, this study focus on description to understand the applicability and limitation of the existing model in the context of Malaysian writers.

Journal articles from Scopus database follow the international standards so the articles would have been edited and may not reveal much difference in the writing of the Malaysian researchers from the other nationalities; however, studies using articles from IEEE database (Anthony, 1999; Shehzad, 2012) have reported that variations in rhetorical strategy still subsist despite the prescribed standard and editing process. The variations must be understood if the models are to be used as pedagogic tools. Shehzad (2010, 2011, 2012) used research articles published on Institute of Electrical and Electronics Engineers (IEEE) database. The IEEE journals also has an international standards that may result the articles to be edited and rendered the articles to conformity; however the findings showed that rhetorical variations persisted despite the given international standards. When compared to the CARS model (Swales, 1990 & 2004), the Computer Science research writers were found to take different strategies. Shehzad (2010) reported that the Computer Science writers make more "promotional strategies" by drawing heavily on the strategy of "announcing principle findings", "indicating a gap" and "indicating the structure of the research article". The strategies were obligatory in the articles studied whereas were suggested as optional strategies in CARS (Swales 1990 & 2004). When the finding was compared to other studies done in a 20 year span (Swales & Najar, 1987; Posteguillo, 1999, Anthony, 1999) and Shehzad (2010) asserted that promotional strategy is growing in trend in Introduction section of Computer Science articles. Later on, Shehzad (2012) also reported on other divergence from the CARS model (Swales, 2004) and even suggested that a step

in CARS Model (Swales, 2004) on "clarifications of definitions" "should be included in the pedagogical guidelines, rather than the model itself" (p.34). Anthony (1999) used articles with "Best Paper Award" from IEEE database and also reported many divergence from the CARS model (Swales, 1987) The studies (Anthony, 1999; Shehzad, 2009, 2010, 2011,2012) showed that despite having an international standard and being edited, variations in the utilization of the rhetorical strategies subsist and the divergence from the standard model need to be addressed and understood if the models are to be used as pedagogical tools.

Even though Shehzad (2009,2010, 2011, 2012) and Anthony (1999) has added an understanding on the divergence of introduction section of computer science article, that enable better interpretation of CARS model for pedagogical application, the studies focused on discipline variation and had little consideration whether the writers were native English writers or non-native English writers.

As a result, the findings provided explicit descriptions on how the Computer science research articles were written in line with the international standard on the other hand present little perspective on how the non-native English writers fare in utilizing the model. Moreover, both studies by Anthony (1999) and Shehzad (2009,2010, 2011, 2012) were done using articles from IEEE database whereas the Malaysian writers are expected to publish in journals indexed in

Scopus database. Therefore similar description for Scopus database articles written by Malaysian researchers are left with much to be desired.

1.3 Objectives of the Study

This study aims to:

1. Investigate the moves and steps typically found in research article introductions in the Computer Science discipline that are written by academicians in Malaysian universities.

2. Investigate the extent of conformity to the CARS model (Swales, 2004) in writing Computer Science research article introductions by academicians in Malaysian universities.

1.4 Research Questions

The research questions (RQs) for this study are motivated by the problems explained earlier. The research questions for this study are as follows:

RQ1. What are the moves and steps typically found in the research article introduction in the Computer Science discipline that are written by academicians in Malaysian universities?

RQ2. To what extent do the academicians in Malaysian universities conform to the CARS model (Swales, 2004) in writing Computer Science research article introductions?

1.5 Theoretical Framework

The framework for this study is within the theory of applied genre analysis by Bhatia (1993) and Swales (2004). Genre analysis, as an insightful and thick description of academic and professional texts, has become a powerful and useful tool that can be utilized for a number of applied linguistic and pedagogic purposes (Bhatia, 1993, p. 11). In relation to this, Bhatia has proposed a model as in Figure 1.1.

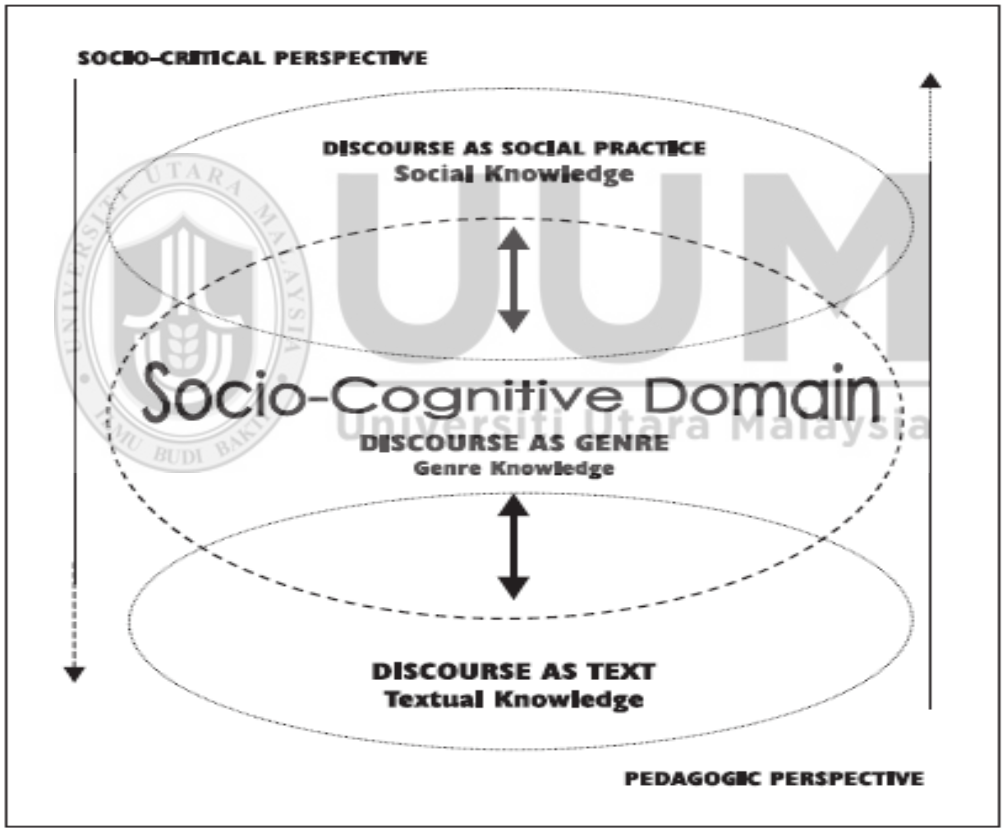

Figure 1.1. Theoretical Applied Genre Analytical model

In Figure 1.1. Bhatia (2002, p.16) proposed two main perspectives: the socio-critical perspective and the pedagogic perspective. Bhatia also proposed four

ways to use the model in genre studies and this study adopts "The pedagogical perspective" (Bhatia, 2002, p.14). Adopting this perspective, the analysis conducted is set "to prepare students to meet the communicative demands of disciplinary communication". In other words, the cause of this study is the intention to discover the communicative demands that are relevant to a specific application, in this case, research article writing.

Bhatia (2002) added that this perspective helps to integrate the findings of genre analysis with language learning procedures so that the students can meet the demands imposed by the discourse community. He further recommended (p.11) that in answering the question of "why are specific discourse-genres written and used by the specialist communities the way they are? A model that has been proposed by Swales".

The Swales CARS model on research article introduction has been revised a few times (1981, 1990, and 2004). Swale (1990) asserts that awareness on genre is important to enhance the ability of producing communication which is appropriate to the situation and context. Such awareness in the communicative convention often affects the linguistic choice of the user. Findings of the genre analysis help students to be aware of the communicative purposes and the conventions which are necessary for academic and professional contexts (Swales, 2004). Therefore, in order to create the awareness, the thick description of the targeted genre is crucial.

In short, this study adopts the "Pedagogical perspective" of the Applied Genre Analytical model proposed by Bhatia (2002) and the Swales CARS model (2004). The course of this study is to discover the communicative demands that are relevant to a specific application, in this case, research article writing.

1.6 Significance of the Study

This study is expected to add to the understanding of research article writing, particularly in the Computer Science discipline. This study confirms with other studies that found research article introductions are written in a specific way according to the discipline (Anthony, 1999; Posteguillo, 1999; Shehzad, 2012). Even though many existing models proposed that research articles should be written in a specific way, it was found that writers of different disciplines do use different moves and steps in writing the Introduction section. While existing models in academic writing books propose a standard way of writing research articles, it was uncovered that writers of different disciplines put different emphasis on some strategies. For example, it was found that while the existing model (Swales, 1990; 2004) recommended that "Establishing a niche" by using citations and "adding to what is known" as an optional strategy, this study confirms with other studies in the Computer Science discipline (Anthony, 1999; Posteguillo, 1999; Shehzad, 2012) that the Computer Science writers use these strategies as an obligatory strategy. This study confirms the previous findings that the Computer Science writers establish the research niche early in the Introduction section by citing the works of others and adding to what was proposed by previous researchers. As such, this study adds to the understanding

of research article writing, particularly in the Computer Science discipline by pointing out the differences in the Computer Science articles as compared to the existing writing models (Swales, 1999; 2004).

This study is expected to contribute to the understanding of the application and limitation of the existing model as a pedagogical tool. Anthony (1999, p.45) has cautioned the use of the existing model "as it is" and suggested that it be used as a pedagogical tool; the application and limitation of the model must be understood. This study is expected to contribute to the understanding of the application and limitation of the existing model by describing which moves and steps are highly preferred and which are underutilized. And then, the descriptions highlighted on the techniques on how each move and step is accomplished by supporting the techniques using excerpts from the target publication. Given that many English teachers are not content experts in the Computer Science discipline, having the excerpts and the various techniques give a more detailed picture of how the moves and steps in the CARS model can be accomplished by the learners. The techniques and the excerpts on the realization of the strategies are useful as they are derived from the target publication database, which is Scopus. The understanding of which moves and steps are underutilized by non-native English writers also cautions the learners and the teachers of the challenging moves and steps that need to be emphasized in teaching and learning. The descriptions, techniques and excerpts provide the schemata on the actual practice in the target publication which, in turn, empower

the language instructors and the learners with comprehension and insight on the applicability and limitation of the existing model.

This study is likely to add to the understanding of the utilization of the rhetorical strategies in research article introductions written by non-native writers. Experts have cautioned that rhetorical discourse is challenging even for native writers (Gross, Harmon & Reidy, 2000; Swales, 1990). Following this, Flowerdew (1999) has warned that if contributions of non-native English writers in international English publications are to be encouraged, then it is important to conduct research at the micro level, especially in terms of individual linguistic and cultural backgrounds to discover the perceptions, problems and strategies used by non-native English writers. In relation to the challenges and the call for more study (Gross, Harmon & Reidy, 2000; Swales, 1990; Flowerdew, 1999), this study hopes to present the description of the utilization of the rhetorical strategies used by non-native English writers, in particular, Malaysian researchers. The descriptions illustrate the preferred moves and steps and also point out those that are less attempted by non-native writers as compared to the global norm. This study conforms to the findings on strategy preference that non-native English writers avoid "indicating a gap" similar to the Indonesian (Adnan, 2005) and the Turkish writers (Karahan, 2012); in contrast to 95% of the global Computer Science writers who utilize this strategy (Shehzad, 2012). In short, this study adds to the understanding of the utilization of the rhetorical strategies in research article introductions written by non-native writers by pointing out the preferred and underutilized strategies.

This study is expected to contribute to the understanding of the rhetorical structure practised by Malaysian writers. This study presents the preferred and the underutilized rhetorical structures in the writings of Malaysian writers published in target publications. By understanding the practice, the writing instructors and learners can know which moves and steps are to be emphasized during teaching and learning. Given that some of the steps are necessary but often not employed, the writing instructors and the learners can take precaution to ensure that the warranted strategies are fulfilled.

The descriptions also look at the techniques on how the moves and steps have been accomplished by Malaysian writers; as such the elaborations and samples can be used as writing samples for Malaysian learners and teachers. In short, this study is expected to contribute to the understanding of the rhetorical structure practised by Malaysian writers.

1.7 Definitions of Terms

Research articles

In this study, research article refers to the Computer Science research articles in English, written by Malaysian academicians, published in 2010 Scopus.

Research article introduction

This study defines research article introduction as the Introductory section in the research article and this includes the subsections that come within the Introductory section.

Genre analysis

This study defines genre analysis as proposed by Bhatia (2002: 6) which is "...investigating instances of conventionalized or institutionalized textual artefacts in the context of specific institutional and disciplinary practices, procedures and cultures in order to understand how members of specific discourse communities construct, interpret and use these genres to achieve their community goals and why they write them the way they do."

Move

In this study, a "move" goes by the definition in Swales (2004, p. 228-229) which is a "rhetorical unit" that performs "a communicative function". A move fulfills its linguistic realization function through a clause, several sentences (Swales, 2004) or several paragraphs (Jogthong, 2001). Move analysis is also referred to as Swalesian genre moves by Upton and Connor (2001).

Rhetoric

Rhetoric is defined according to Porter (2011, p.1) "...effective thinking, writing, and speaking strategies".

Rhetorical strategy

The scheme that writers have chosen to articulate their purposes to achieve a particular context (Porter, 2011)

Academicians in Malaysian Universities

The classifications of academicians in Malaysian universities are chosen based on the university affiliation and information given in the biodata sections.

Rhetorical move

Following the definition of "rhetoric" and "move" earlier, rhetorical move is defined as the act of realizing effective thinking, writing, and speaking strategies.

1.8 Summary and Organization of the Thesis

In Chapter one, the topic of the study is introduced and the problem statements are presented. From the problems of the study, two objectives of the study have been formulated, which are to identify the move and steps found in the research article introductions in the Computer Science discipline that are written by the academicians in Malaysian universities, and also to identify the problems faced by the Computer Science research article writers when writing. The chapter also states the research questions and the significance of the study. It also presents the operational definitions of the significant key words used throughout the study.

Chapter two of this thesis presents the literature review related to research article writing, particularly the Introduction section. It begins with the historical overview on research article writing. Next, the approaches used by the other writers in conducting research article writing are described and they explain how this study would complement the existing body of knowledge. The chosen approach which is related to move analysis, and the CARS model (Swales, 2004) are explained, and previous studies which also used the approach are

described. In this chapter, the studies on research articles written by non-native English writers are presented and discussed.

Chapter three presents the methodology used for the study. The qualitative method epistemology is presented. The study uses textual analysis. And the justification for using textual analysis is given in Chapter three. The research article sampling and the justification for the sampling is explained after which the interrater process for the textual analysis is described. Another method for the study, which is the interview, is described and the rational for the interviews is given. In Chapter 3, the explanation on the pilot study conducted is given, mainly on the purpose, the findings and how the pilot study influenced the main study.

The findings of the main study are reported in Chapter four. The findings of the textual analysis and interview are presented here. The textual analysis central to the macro and micro analysis and the findings from both analyses are explained here. This chapter also presents the findings of the interviews to triangulate the textual analysis.

Finally, Chapter five presents the discussion, implications and limitations of the study. The discussion recollects the findings of this study and examines them with the findings of other similar studies. The implications of the study which involve research article writers and language instructors teaching research article writing are suggested. Next the limitations of the study are stated and finally it ends with recommendations for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The literature review chapter begins with the historical overview of research article in 2.1 and then moves to describe the prevalent structure used for research article writing. Next in 2.3 the chapter describes the various approaches taken by researchers in the study of written academic discourse. After that, the chapter gives an explanation specifically on the genre analysis in 2.5 before focusing on the CARS model (Swales, 2004) and the application to the move analysis in 2.6. The following section of 2.7 describes previous studies conducted on research articles by non-native English writers.

2.2 Historical Review on Research Article Writing

This section explains the beginnings and the dynamic progress of research article writing which has offset the development of research article writing in terms of structure, readership and purpose.

Day (1989) reported that prior to the 19th century, communication among scholars and scientists were through letters or orally and after the invention of printing in 1455, they began to use books. In relation to that, the earliest pre-independent Malaysian scholarly English periodical was the Journal of the Indian Archipelago and Eastern Asia published in 1847 in the Straits Settlement. The contributors for the journal were government officers, military men, naval

officers, lawyers, doctors, merchants, planters and other professionals of various nationalities including the English, French, Germans, Dutch, Swiss and even Chinese (Tiew, 1999). However, it was not mentioned if the local natives also contributed in the writings. The first journals were in the form of letters and the style of writing was descriptive, chronological, loosely organized, the language was excessively wordy (Day 1989) and dependent on the author (Connors 1982). The inability to write among engineers was discussed in journals (Ulman & Gould, 1972; Tebeaux, 1980) and a few textbooks on technical writing came to their assistance in early 1900. From then on, writing research articles became more standardized and structured. (Connors 1982).

2.3 Approaches for Written Academic Discourse

Flowerdew (2005) and Connor (2004) have conjured up a few methodological categories for written academic discourse. Flowerdew (2005) recollected four methodological categories and the first one in the list was the genre analysis for study on generic structures of moves for the development of pedagogic materials. Another methodology described was corpus linguistic for large databases which were also pointed out by Upton and Cohen (2009) as being too focused on qualitative distribution of lexical and grammatical features, thus disregarding discourse structure and organization. One more method in the list was contrastive rhetoric which Conner (2004) argued was not a specific methodology but rather, a goal that employed several methods. The last one in the list was ethnography which was described as contextually restructured and less amendable for application in the pedagogical environment.

Connor (2004) also listed four methodological categories for written academic discourse and all concurred with Flowerdew's (2005) list of methodologies which were corpus linguistic, genre analysis and ethnography except for text analysis which was described as suitable for large copora aimed at gaining insights into the practices of the community and also used for contrastive rhetoric. Connor (2004) described that the contrastive rhetoric approach was derived from three major schools of thoughts which were the Prague school of text, Systemic linguistic as proposed by Haliday (1985) and the New school of written discourse based on the Nord text and the Nord write project.

Among all the methodologies mentioned, this study decided on employing the genre analysis method for the benefits described by Connor (2004) and Flowerdew (2002) which include "focus on the generic structures and rhetorical functional analysis" (Connor, 2004, p.97) which are related to the problems and the aim of this study by being able to provide "generic structure useful for analysis" (2004, p.297) and to make them amendable for pedagogical application (Flowerdew, 2002).

2.4 Genre Analysis

As mentioned in the previous section, Connor (2004) and Flowerdew (2002) categorized genre analysis as one of the major methodologies in the study of written academic discourse that gives focus on the generic structures and rhetorical function analysis and is also useful for pedagogical applications. Swales (2002) pointed out that the genre analysis can be used as an analytical resource to understand professional discourse which will enable learners to use

generic knowledge to respond to novel social context and also can be used as a resource to create new forms of discourse to achieve pragmatic success as well as other powerful human agenda.

A simple definition by Bhatia (2002) of genre analysis is the study of situated linguistic behaviour. Bhatia (1999) listed out four important contributors to such language use which are:

> Purpose : Institutional community goals and communicative purpose
> Products: Textual artefacts or genres
> Practices: Discursive practices, procedures and processes
> Players : Discourse community membership
>
> Bhatia (2002, p.6)

Bhatia (2002) later on indicated that with regards to cross-cultural factors in research writing, the tendency for most academics was to conform with the established conventions and standards of English publication because of its recognition. However, previous studies on research articles by non-native English writers (Kourilova, 1998; Sheldon, 2011; Kanoksilapatham, 2007; Mirahayuni, 2010; Teodora, 2012) indicated variation and discrepancies in the realization of moves and steps. Unlike the suggestion by Bhatia (2002) and despite the recognition, the non-native English writers did not fully conform with the established conventions and standards of rhetoric in research article writing. Therefore, this study intends to look for similarities and differences in the research article writings according to a model for investigating the rhetorical structure by Swales (1990, 2004) that has been described as the "best known

and most comprehensive work on research article introductions" (Fakri, 2004, p.112) .

Swales (2002) enlightens that analyzing genre means investigating instances of conventionalized or institutionalized textual artefacts in the context of specific institutional and disciplinary practices, procedures and cultures in order to understand how members of specific discourse communities construct, interpret and use these genres to achieve their community goals and why they write them the way they do. The multi-disciplinary areas that have used genre analysis include linguists, discourse analysts, communication experts, rhetoricians, sociologists, cognitive scientists, translators, and the multidisciplinary application, geographical distances, socio-critical look, and theoretical issues in focus have brought forth variations in the models (Swales, 2002).

In addition, Bhatia (1993, 1997) described the Swales model to be comprehensive and having pedagogic relevance apart from having the combination of socio-cultural, psycholinguistics aspects of text construction and interpretation with linguistic insights necessary to answer the question "Why are specific discourse-genres written and used by the specialist communities the way they are?" This study employs the Create- A- Research- Space (CARS) model proposed by Swales (1990, 2004) which has been used for analysing rhetorical structure in research articles in various studies (Ngowu, 1997; Samraj, 2002; Kanoksilapatham, 2005, 2011).

Genre analysis has been described as being comprehensive enough "to combine socio-cultural and psycholinguistic aspects of text-construction and interpretation with linguistic insight" (Bhatia, 1993, p.11). The comprehensiveness is very important to the research problems which emphasize on creating a platform to improve the rhetorical writing ability, which according to Gross (1990), is to support research claims, defend research findings, relate the research to the current wall of knowledge and convince the other researchers on the methods and research practice.

Another motivation to use genre analysis as the approach is because it has been successful in providing thick description for many significant studies such as the studies by Hajibah (2008), Bhatia (1993, 1997), Swales (1981) and Duncan (2008). On top of that, genre analysis has also advanced into many genres (Kaplan & Grabe, 2002) such as promotional brochures (Hajibah, 2008), PhD theses (Salom, Monreal & Olivares, 2008), research grant proposals (Feng & Shi, 2004) research article Abstracts (Swales & Perales-Escudero, 2011) Direct Mail letters (Upton & Cohen, 2002) and many more. This confirms the prediction of Bhatia back in 1993 (p.11) when he stated that "Genre analysis as an insightful and thick description of academic and professional texts has become a powerful and useful tool to arrive at significant form-function correlations which can be utilized for a number of applied linguistic purposes".

A further reason for choosing genre analysis is because genre analysis has progressed over the years, and thus is matured enough to yield developments of various models such as the Four move models for research article introductions

by Swales (1987), CARS model by Swales (1990), Multi Perspective model by Bhatia (2002) Project Justifying model by Ahmad (1997) and Problem Justifying model by Safnil (2000).

Another factor that drives this study to choose the genre analysis is the progress made in genre analysis did not stop at having many models developed instead the progress moved on to having the models tested and used in many studies (Jogthong, 2001; Mirahayuni, 2002; Kanoksilapatham, 2005; Upton & Connor, 2001; Upton & Cohen, 2009; Salom, Monreal & Olivares, 2008; Syafik and Sri, 2010; Kanoksilapatham, 2010). In the studies, the researchers used genre analysis which trailed Swales' seminal work (1990) Move-Step model in the area of scholarly writing across disciplines and languages. Accordingly, the move and steps study, which is also known as the move analysis, reconciles "effort to understand how academic intellect is shaped and constructed and allows certain textual components to emerge and be classified" (Kanoksilapatham, 2010, p. 138). For the reasons above, the CARS model by Swales (1990) is chosen as one of the models for this study. Swales' move-step model is discussed extensively in section 2.5.

Despite the fact that many studies have been conducted on genre analysis (Hajibah, 2009) and the regular patterns of writing structure within the articles of similar disciplines have been reported, the findings on the non-native English research article writings are confounding (Safnil, 2000; Jogthong, 2001; Ahmad, 1997). On the one hand being in the same genre indicates regularities that imply the generality of pattern and that this manner of communication is expected

from the members of this particular scientific discourse community (Mirahayuni, 2002) and on the other hand, differences in rhetorical moves have been reported in the research articles written by non-native English writers even when the research articles are from the same genre (Mirahayuni, 2002; Holmes & Asmahan, 2002).

Therefore, following the disparity of rhetorical moves reported in non-native English writers' research articles, this study sets to examine the Computer Science research articles even though this genre has been studied (Posteguillo, 1999; Shehzad, 2005, 2006, 2007, 2010, 2011, 2012). Specifically, genre studies on Computer Science research articles have reported on the generic structure of Computer Science journals by using a model that is also traced back to Swales' move analysis (Shehzad, 2005, 2006, 2007, 2010, 2011, 2012). However, the studies have focused on cross discipline analysis and did not examine the non-native writer aspect as intended in this study.

2.5 CARS Model

Create- A- Research- Space (CARS) model was formed and revised by Swales through a series of modifications (Swales, 1987, 1990, 2004) which was motivated by the developments and findings of research studies (Swales, 2004; Tas, 2008) that follow suit the first formation of the model which was based on "an analysis of 158 research article introductions in English distributed across various discipline areas" (Hirano, 2009, p. 241). It was developed to enable analysis of the "main rhetorical patterns of organizing introductions in research

articles" (Fakhri, 2004, p.112) and have been used in many researches (Swales & Najjar, 1987; Ahmad, 1997; Jogthong, 2001; Samraj, 2002, 2008) that later on influenced the modification of the models (Swales, 2004).

2.5.1 CARS Model Version 1990

In 1990, Swales proposed the following CARS model that suggested writers write research article introductions with aims in three moves: *Establishing a territory, establishing a niche and occupying a niche.* The first step of *establishing a territory* refers to the act of creating a subject area for the intended research. The subject area is put in the picture and conveyed using any of the three steps: *Claiming centrality, making topic generalization and review of previous research*. *Claiming centrality* is when the writer puts forward the subject that is in focus. After bringing in the subject, the writer may choose to make the topic generalization where general circumstances and conditions about the subject are given. The writer may also review some of the previous research and include some citations with regards to the subject being introduced. Bringing in the previous study initiates a link that marks the subject with the existing discussion in the research community. While there are three steps in fulfilling Move 1, the writer may use one of the steps or combine any of the three steps.

The next move, which is Move 2, is *establishing a niche.* This move is where the writer reveals the niche or the specialized area in the subject which has already been mentioned in general, earlier in Move 1. Swales (1990) suggested

that Move 2 can be fulfilled by using one or any of the four steps which are *counter claiming, indicating a gap, question rising and continuing a tradition.Counter claiming* is where the writer states that the niche has "become necessary" (Swales, 1990, p.142) or accepted by the academic cult. At this stage, the writer presents the subject with more specifications to an explicit research area and shows that studies in the specific research area are widespread and accepted by the research community.

After presenting that particular research area, the writer may opt to realize the next step which is *indicating a gap*. In fulfilling this step, the limitations or the shortcomings of the existing studies in the specific area of study are specified. Next the optional step of *Establishing the niche of the study* is by using *Question rising*. In this step, the question about a particular detail is raised, for example, "However, it is not clear whether the use of can be modified to reduce" (Swales, 1990, p.143). Bringing up the question suggests that there are some unresolved matters in the niche area that need attention. The fourth possible step for Move 2 is *Continuing a tradition* where the proclamation that research in the particular area needs to be further explored is given. The statement, one way or another, indicates that studies in the specific area must be carried out. Figure 2.1 illustrates the summary of the Swales model (1990).

Move 1: Establishing a territory	
Step 1:	Claiming centrality, and/ or
Step 2:	Making topic generalization(s), and/ or
Step 3:	Review items of previous research
Move 2: Establishing a niche	
Step 1A	Counter-claiming, or
Step 1B	Indicating a gap, or
Step 1C	Question-raising, or
Step 1D	Continuing a tradition
Move 3: Occupying a niche	
Step 1A	Outlining purposes, or
Step 1B	Announcing present research
Step 2	Announcing principle findings
Step 3	Indicating research article structure

Figure 2.1. CARS Model version 1990

The last move in this model is Move 3 which is occupying a niche. Swale (1990) describes this move as to "turn the niche established in Move 2 into a research space" that justifies the existence of the present article. In this move the proposed study is presented as a means to support Move 2. The intended research is revealed as a contribution to counter claims, fulfill the research gap indicated, answer the question raised or continue with the research tradition. This move can be realized by outlining the purpose of the study or announcing the present research. The examples given for *outlining the purpose*s of the study are: "This paper reports on the results obtained" and "The aim of the present paper is to". In announcing the present study, the example given is "In this

paper, we argue that" and "The paper hopes to show that" (Swales, 1990, p. 160).

After stating the purpose or *announcing the present research*, Move 3 is further realized by *announcing the principle findings*. Swales (1990) suggested that writers announce the important finding of their study in the Introduction section following the findings of Swales and Najar (1987). Rather than taking the chance that the reader would read the paper to the end, the finding is put in the Introduction section as a promotional strategy (Shehzad, 2010). This step is followed by indicating the research structure.

The CARS model (Swales, 1990) has been constructed based on the analysis of research article introductions and it was suggested that any mismatch or anomaly in the moves of the research article introduction indicates weakness in the introduction itself. More than a decade later, Swales revisited the model and made some modifications (Swales, 2004). The modification was necessary because of the dynamism in research article writing and also because of the findings from the studies that followed suit.

2.5.2 CARS Model Version 2004

The revised model (Swales, 2004) posits three rhetorical moves that can be realized using 10 variations of steps and possible *recycling*. Move 1 and Move 2 are similar to the previous model. Swales noted that for move 1, "literature review statements are no longer always separable" and for that were released from being "automatic used as signals" for the independent part of move

analysis. Out of the ten steps, four steps were optional and another three were identified as "probable in some fields, but unlikely in others". This study intends to look at all the three moves and the ten steps, and observe the occurrence of possible *recycling* using the CARS model (Swales, 2004)

One of the obvious problems with CARS version 1990 pointed out by previous researchers was in Step 3 Move 1 which is *Review items of previous research*. Samraj (2002) reported that reviewing previous literature and incorporating citations of other work cropped up throughout the Introduction section and were not just restricted to Move 1 only which is *Establishing a territory* and "literature review statements are no longer always separable elements..." (Swales, 2004, p. 227).

The improvement made in the 2004 model was highlighted by Swales himself (2004):

> "I therefore propose that these four realizations be reduced to two, and also that the model take on board the potential cycling, or iteration...which many investigators have found to be prevalent, especially in longer introductions." There were also a few more modifications made as explained earlier, and the modifications were made as "the result of evolution in the genre itself or of further studies..." (p. 230)

Similar to the CARS model version 1990, the revised CARS model (2004) also begins with *Establishing a territory* and *topic generalization*. However, in this revised model, citations are required and the *topic generalization* has the quality of increasing specificity to the intended research. In other words, unlike the 1990 model where *review items of previous research* was set as a step on its own as Step 3 in Move 1, the 2004 version incorporates the *review of previous*

research as obligatory support for the steps on *establishing territory* and *topic generalization with increasing specificity*.

Next in Move 2 is *establishing a niche* which remains unchanged as in the 1990 version. However, the steps for this move are transformed in the revised version where they may be supported with citations and are realized either by *indicating a gap* or *adding to what is known*. Citation is not obligatory but may be used to support the steps in this move. Indicating a gap is a step that also exists in the previous version and the function remains the same. *Adding to what is known* seems like a new step but actually this step is similar to the steps in the previous model where the previous research is reviewed, development in the research area is explained, unresolved matters in the research are pointed out and the stance on the research development is presented.

After fulfilling either of these two steps, Swales (2004) added a new move which is *possible recycling of increasing specificity*. This move is dependent on the other moves mentioned before because it is actually a repetition of Move 1 and Move 2 along with the steps within the moves and the repetition occurs with increasing specificity to the intended research. The next step in Move 2 is *Presenting justification* where the writer, one way or the other, asserts that the research must be carried on. However this step is optional so the writer may or may not present the justification for the intended study.

Move 3 in the CARS model is about *Presenting the present work*. Presenting the present work is gaining more importance particularly when the number of

publication escalates every year and the competition among the submissions to the editorial also intensifies. The strategy on presenting the present work may affect how the research article fares against other submissions. In facing the competition, the presentation of the research work in the introduction must be interesting, relevant, worthy and is able to captivate the intended audience. As Shehzad (2011, p. 141) puts it, Move 3 in the Introduction sections of the research articles have the "same purpose as the headlines for the newspaper". For the most part when the editorial, reviewers and readers have many options and choices, the presentation of the present work in the Introduction section of the research articles must be engaging and appealing enough to hold the interest for further reading.

Realization of Move 3 in the CARS (Swales, 2004) model has one obligatory step, three optional steps and three other steps which are probable in some fields, but unlikely in others. Step 1 in Move 3 is the obligatory step, which is *Announcing the present research descriptively and/ or purposively* (Swales, 2004). In this obligatory step, the readers are presented with the information on what the rest of the paper is going to be reporting or discussing. The model puts it that this can be done in two ways: purposively, which is by stating the purpose and reasons on why the study is done and/or descriptively, which is by describing, listing, recounting the composition of the study. Shehzad (2011, p.139) elaborated that purposive announcement is where the authors indicate their main purpose or purposes or outline the "nature of the study", and descriptive announcement is where the authors "describe the main feature of

their research". In other words, this step is where the readers are informed about the reasons, and the rationale of the study is presented. Figure 2.2 illustrates the CARS model (2004).

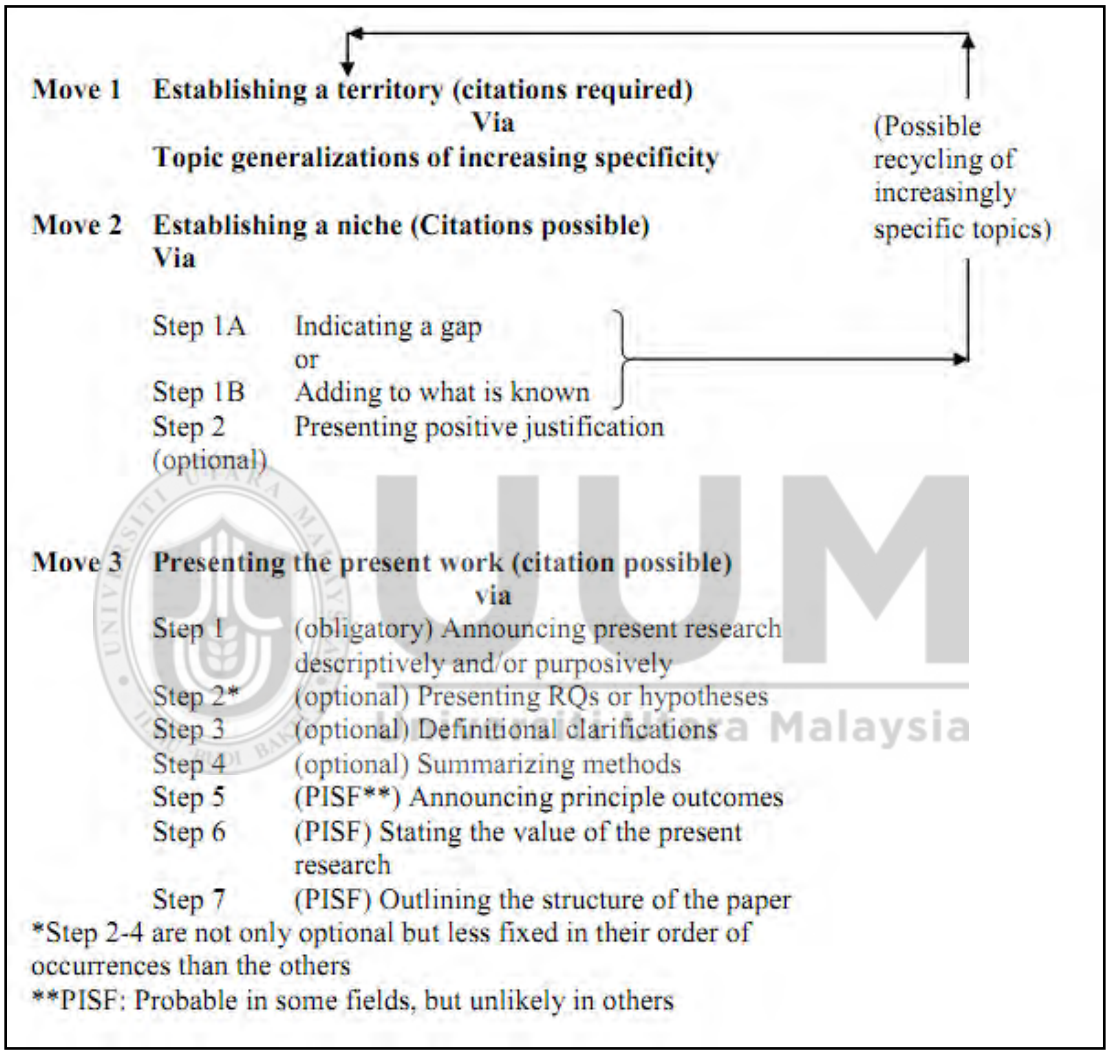

Figure 2.2. CARS model version 2004

The next step is Step 2 which is *Stating the research questions or hypothesis* and is suggested as an optional step for Move 3 *Presenting the present research*. Sheldon (2011, p. 246) described the step being utilized by native writers as

being "more explicit about what the researchers are investigating, an approach that makes their text less demanding to the reader"

The following step for Move 3 is *Definitional clarifications* which can be realized by giving brief explanations on some of the methods, terms, techniques, modes or concepts related to the study. This step is optional and the reason for having the *definitional clarification* is to give a clear meaning to the item in context and regularize it. Another optional step for Move 3 is *Summarizing methods* where brief information on the method used in the study is presented. Steps 2, 3 and 4 are not only optional but also less fixed in order.

The following steps of 5, 6 and 7 are probable in some fields but unlikely in others. Step 5 is *Announcing principle outcome* where the main findings of the study are presented to establish the research contribution as early as possible in the research article. While Swales (2004) listed this step as probable in some fields, studies on Computer Science research articles have shown that this step is obligatory (Posteguillo, 1999; Shehzad, 2007; 2010). The next step is Step 6 – *Stating the value of the present research*. This step is also reported as obligatory in the Computer Science research article introductions (Shehzad; 2007; 2012). In this step, the writers promote their studies and highlight the value of their research. The last step in the CARS model (Swales, 2004) is *Outlining the structure of the paper* where the outline of the research article is briefly explained.

The CARS model (1987, 1990) has been used in many researches (Swales & Najjar, 1987; Ahmad, 1997; Jogthong, 2001; Samraj; 2002, 2008) and brought forth many findings. Over the decade, research articles as professed by Swales (1990) of being dynamic were found to also undergo various changes and trends which were reflected in the studies mentioned. For example, as explained by Swales (2004), Samraj (2002) pointed out that another step was taken by the writers after the research gap was indicated. Reflecting on this, Swales included the step *presenting positive justification* to the new model. The dynamism of the genre and the findings of the rapid studies enabled Swales to modify the model (2004).

There are a few reasons as to why this study uses the CARS model version 2004. The reasons are mainly concerned with the dynamic nature of the research article (Swales, 2004; Shehzad, 2011) problems pointed out by previous researchers in using the 1990 model (Swales 2004, Samraj, 2002) and the improvements made in the 2004 version by Swales himself (2004). The following paragraphs elaborate the points in detail.

The dynamic nature of the research article was pointed out by Shehzad (2011) particularly on "the increased trend in the" promotional strategy through the realization of Step 2 in Move 3 which is *Announcement of the principle finding*. Shehzad (2010) showed the increase by plotting her new found percentage to the percentage gathered from previous studies (Swales and Najjar, 1987; Berkenkotter and Huckin, 1995 in Shehzad, 2010). Because of this dynamic nature, the CARS version 2004 has more advantages as the revised version

would have captured the changes and trends that took place over the 14 year period. This study will be using the revised CARS model (2004).

Having studies using a similar model allows the findings for the moves to be evaluated side by side; so this study uses the CARS model by Swales (2004) which represents the prevalent rhetorical pattern (Adnan, 2009). The CARS model (Swales, 1990, 2004) has been described as being "seminal in shaping the genre theory in English for specific purpose (ESP)" (Flowerdew, 2005, p. 322), "dominant approach for ESP" (Dudley-Evans, 2000, p.4) and 'received prominence in the area of ESP' (Dong & Xue, 2010, p. 37). Other researchers have also acknowledged (Bhatia, 1993; Samraj, 2002; Shehzad, 2010, 2010a, 2010b) that this model has successfully described most of the rhetorical strategies in various genres of research article introductions in units of "move" and "step".

Although there is a good number of studies that used the CARS model (Swales,1990), most of the studies were done using the CARS model version 1990 (Fakhri, 2004, Hirano, 2009; Mirahayuni, 2010; Shehzad, 2010a; 2010b; 2011; 20012; Yaghoubi-Notash & Tarlani-Aliabadi, 2012,). Only a small number of studies used the CARS model version 2004 (Mello, 2011). Therefore there is a need to add to the limited number of studies by using the CARS model version 2004.

2.6 Move Analysis

Move analysis (Swales, 1981, 1990) is by far the most common example of such a specific genre-level analysis. Move analysis is also known as the "Swalesean genre moves" analysis (Upton and Connor, 2001: 317) and is developed as a top-down approach where the focus is on meaning and ideas. In order to analyze the discourse structure of texts from a genre, the text is described as a sequence of 'moves', where each move represents a stretch of text serving a particular communicative (that is, semantic) function. The analysis begins with the development of an analytical framework, identifying and describing the move types that can occur in this genre: these are the functional/communicative distinctions that move types can serve in the target genre." (Upton and Cohen, 2009: 4).

Move analysis has been used by many researchers. Ahmad (1997) used it as the initial analysis for Malay scientific research articles, and from here she proposed the Project-justifying model. Move analysis specifically on the CARS model was also tested on Indonesian research articles by Safnil (2000) and Mirahayuni (2002) at the PhD dissertation level. Safnil (2000) came up with a new model Problem Justifying Project (PJP) for rhetorical analysis on Indonesian research article introductions.

There were also research works on move analysis that were an extension to the Swales (1990) CARS model. The study by Zifirdaus (2011) analyzed the Indonesian research article introductions in education and found "none of the

research article introductions fit the CARS and only less than half fit the Problem Justifying Project (PJP) model proposed by Safnil (2000). Salom, Monreal and Olivares (2008) used Bunton's model which was also a modification of Swales's model to study the Introductory sections of PhD Theses. All in all, move analysis is a suitable analysis method for this study on the genre of Computer Science Scopus journal articles.

2.7 Merging Genre Analysis And Corpus Based Discourse Analysis

This study is rooted in the area of genre analysis under the tradition of applied discourse analysis as Bhatia (1993, p.4) explained "much of the applied discourse analysis in linguistics, particularly on functional variation in written discourse belong to this strong tradition". Bhatia added that earlier work on discourse analysis by Widdowson, Halliday and Bhatia, and genre analysis of research writing by Swales "all belong to this tradition" (p.4). On the other hand, Flowerdew (2002) and Connor (2004) listed genre analysis as a category of methodology for written academic discourse. This study follows the views of Flowerdew (2002) and Connor (2004) for the following benefits of "focus on the generic structures and rhetorical functional analysis", capable of providing "generic structure useful for analysis" (Connor, 2004, p. 297) and is amendable for pedagogical application (Flowerdew, 2002). Applied discourse analysis, written academic discourse and genre analysis offer a range of models that can be used.

Some models used in other research article genre studies are Four Move model (Swales, 1981), CARS model (Swales, 1990) Project justifying model (Ahmad, 1997) Problem solution model (Hoey, 1979; Zappen ,1983) Problem Justifying Project model (Safnil,

2000) and Ideal problem solution model (Adnan, 2009). Critiques on problem-focused models pointed out that not all research begins with a problem or "has a recognizable problem" and the other models (Adnan, 2009; Safnil, 2000; Ahmad, 1997) are for research article introductions in other languages than English. Bhatia (1993, p.11) commended the Swales model as capable to "introduce a thick description of language in use" apart from "Combine socio-cultural" and "Psycholinguistic (including cognitive) aspects of text construction and interpretation with linguistic insights". This study chooses the model by Swales (2004) to be used in the move analysis as explained in section 2.5.2

Beiber, Upton and Cohen (2007) listed two approaches for move analysis, namely the bottom-up approach and the top-down approach. The bottom-up approach is where the lexical and form focus are identified first before the discourse unit types emerged from the corpus patterns (Beiber, Upton & Cohen, 2002). The top-down approach on the other hand, has the construct identified first (Beiber, Upton & Cohen, 2009) and this simplifies the identification of the moves, therefore giving more focus on the location of the moves and the overall structure of the text (Cortes, 2010). Beiber, Upton and Cohen (2009) stressed that the top-down approach allows better understanding of the features of the moves which are particularly important in instructional context such as English for specific purposes and professional writing workshops. For this benefit, among others, Beiber Upton and Chone (2009) proposed the modified version of the Beiber, Connor and Upton (BCU) approach. This study attempts to use the CARS model for the move analysis in hand with the BCU approach. The application of the CARS model in move analysis using the BCU approach is in Table 2.1.

Table 2.1

Beiber, Upton and Cohen (BCU) Appraoch

Required steps		Application
1	Communicative/ functional categories	Determine rhetorical function of the genre Determine rhetorical function of each text segment in its local context: • Identify the possible move types of the genre. • Group functional and/or semantic themes that are either in relative proximity to each other or often occur in similar locations in representative texts. These reflect the specific steps that can be used to realize a broader move. • Conduct pilot coding to test and fine tune definitions of move purposes. • Develop coding protocol with clear definitions and examples of move types and steps.
2	Segmentation	Segment full set of texts into moves. (This step in a move analysis is done concurrently with Step 3: Classification). • Run interrater reliability check to confirm that there is clear understanding of move definitions and how move/steps are realized in texts. • Identify any additional steps and/or moves that are revealed in the full analysis. • Revise coding protocol to resolve any discrepancies revealed by the interrater reliability check or newly discovered move/steps, and recode problematic area.
3	Classification	Classify all move types.

The BCU approach proposed three major steps (Upton and Cohen, 2006, p.6) which are communicative/functional categories, segmentation and classification. The application to corpus-based move analysis is further illustrated in the following diagram. The first step in the BCU approach is the Communicative / functional categories where the rhetorical function of the genre is determined. In this study, the rhetorical genre is the Computer Science research articles for journal publication. As mentioned in BCU, the "functional" or "semantic themes" are reflected in the steps and moves which have been described in the CARS model (Swales, 2004). Pilot testing was conducted to "test and fine tune" the moves and the results of the pilot testing are described in chapter three. The rest of the steps on Segmentation and Classification provide the parameter for this study.

Step 2 is the Segmentation step which is done concurrently with Step 3. Segmentation and Classification on the full set of the research articles are conducted on the research article introductions section and this is relevant to the scope and research question of this study. In the microlevel analysis, as suggested in the BCU approach (Upton & Cohen, 2006) the moves are identified and classified concurrently.

One of the steps in the approach also includes the need for interrater reliability check "to confirm that there is clear understanding of move definitions and how moves/steps are realized in texts." (Upton & Cohen, 2006:6) and interrater process for this study is explained further in chapter 3.

The framework of this study benefits greatly from the Swales model (Swales, 2004) which is applied using the BCU approach (Upton & Cohen, 2009). The findings from the move analysis which are used to structure another instrument which is meant to answer the second research question. The instrument used is face-to-face interviews and the data is expected to give the answer on the problems faced by the academicians in Malaysian universities in writing the Computer Science research articles.

2.8 Rhetorical Varieties In Research Articles

Previous studies on research articles found some significant variations on research articles' rhetorical structure such as according to various disciplines, nativity of the writers and the language used:

According to various disciplines such as Wildlife Behavior and Conservation Biology (Samraj, 2002), Physics and Educational Psychology, (Swales & Najjar, 1987), Medicine (Ngowu, 1997), Computer Science (Posteguillo, 1999), and Language (Habibi, 2008).

According to nativity of the writers such as Czech writers (Cmejrkova, 1996), Persian writers (Atai & Falah 2005), Finnish-English (Mauranen, 1993 in Williams, 2006) Spanish-English (Williams, 2005 in Williams, 2006), Indonesian writers (Mirahayuni, 2010).

According to the language of the research articles such as Arabic (Najjar 1990), Spanish-English (Moreno, 1997, 1998), Malay (Ahmad, 1997), Thai (Jogthong,

2001), Persian (Zarei & Mansoori, 2007), French (Van Bonn & Swales, 2009), Arabic (Al-Harbi & Swales, 2011), Turkish (Karahan, 2013), pairs of English and other language (Swales & Perales-Escudero, 2011).

The following sections explain the four variants on research articles found in the previous studies.

2.8.1 Rhetorical Strategy Variations Across Disciplines.

A large number of studies have been conducted on research article variations across disciplines such as in Wildlife Behavior and Conservation Biology (Samraj, 2002), Physics and Educational Psychology (Swales & Najjar, 1987), Medicine (Ngowu, 1997), Computer Science (Posteguillo, 1999), Language (Habibi, 2008), Biochemistry (Kanoksilapatham, 2005), Business Management (Lim, 2006), Biomedical (Kanoksilapatham, 2010), Agricultural Sciences (Milagros & Rubio, 2011) and significant variations were found in terms of the rhetorical structure in research articles.

The findings showed that each discipline has its own preferred rhetorical strategy, for example, the Computer Science discipline was reported to be undergoing a trend in increasing self-promotion strategies with the writers announcing the principle outcomes and stating the value of the present research (Shehzad, 2010) but these strategies were not significant in other disciplines such as Medicine (Ngowu, 1997) and Biochemistry (Kanoksilapatham, 2005). Biochemistry writers, on the other hand, were reported to prefer reviewing the items of previous research over indicating a gap and raising question

(Kanoksilapatham 2005). Such manner is attributed to the nature of Biochemistry field which is rich with literature and the writers benefited from nature. Shafiq and Sri (2011) claimed that disciplinary variations can have distinct influences in terms of rhetorical structure and language use.

Studies on Computer Science research articles have been carried out by numerous researchers (Posteguillo, 1999; Hyland and Tse, 2005; Feltrim, 2005; 2003 Shehzad, 2006, 2007, 2010; Johnson & Rozycki, 2010) and these studies focused on the rhetorical structure made in the Computer Science discipline. Posteguillo (1999) studied the introduction-methods-results-discussion (IMRD) structure in Computer Science research articles and found that while the pattern reported as prevalent in many research articles, the pattern cannot be applied to Computer Science research articles as the Computer Science research articles have different sections such as Algorithm and Preliminaries. The study also found that the move on *Announcing principle findings* is widespread in 70 percent of the samples. Such high occurrences for the move of "Announcing the principle finding" were also reported by Shehzad (2010). Such high occurrences are distinctive compared to the findings of the researches in other disciplines such as Education (Yasin & Qamariah, 2014), Applied Linguistics (Atai & Habibie, 2009), and Psycholinguistics and Sociolinguistics (Habibie, 2008). While the discrepancies in the findings suggest a general idea that research article writers do use different rhetorical strategies in different disciplines, the identification on the prevalent strategies used in Computer Science research articles is still limited.

Shehzad (2010) studied 56 Computer Science research articles, focusing on the rhetorical moves using the Swales model version 1990. The studies showed that the move of *Announcing principle outcomes* was at 73 percent and also suggested that this move is prevalent in Computer Science research articles. Apart from the significant difference in Computer Science writing reported by Posteguillo (1999), other researchers have also found that Computer Science writers do have a particular inclination to use this move in their research article writing. While the study by Posteguillo (1999), which was conducted more than a decade ago, gives a good comparative ground, a current study is needed to give the present view on the use of the existing strategy.

One of the moves that is prevalent in a few studies on Computer Science research article introductions is the move on *Establishing the research niche* (Swales, 2004). The comparison on percentages of Move 2 realization in Computer Science research articles suggests that the utilization of this move has grown over the decades and is trending. In 1999, Posteguillo (1999) found only 57% occurrences and associated the low percentage to the Computer Science discipline being a new discipline at that particular time. In the same year Anthony (1999) found 91.7% of occurrences for Move 2 in the Computer Science research articles. Even though there is a big difference between the two studies which were done in the same year; the big difference is reasonable given the difference in corpus choices where; Anthony (1999) examined 12 research articles which had received "Best Paper" awards and Posteguillo (1999) looked at 40 research articles from three journals. The better quality of the papers must

have been the reason why Anthony (1999) found more Move 2 realizations compared to Posteguillo (1999). Even so, the percentages of Move 2 found in both studies were lower than the percentage found in the study conducted a decade later by Shehzad (2008, 2012). Shehzad (2008) found 94.64% occurrences and noted the increase of this move. While the trend is emerging in the international research Computer Science research article introductions, how Malaysian writers progress with this development is unknown and therefore calls for a further study.

Hyland and Tse (2005) who examined the use of the word "that" in 465 abstracts of research articles and dissertations in the field of Applied Linguistics, Biology, Business Studies, Computer Science, Electrical Engineering and Public Administration. The findings showed some differences in the way "that" is used, where the Computer Science writers were reported to use "that" to refer to human writers whereas the others used "that" for impersonal subjects. (Johnson & Rozycki, 2010) Another report on the differences in the writings of Computer Science was by Johnson and Rozycki, (2010) who studied six winning Computer Science research articles and reported a high usage of the personal pronoun "we" in Computer Science research articles. The studies on Computer Science research articles showed the existence of variations in the writing in terms of rhetorical moves and also the lexical choices. However, all of the studies were focused on the discipline variation with not much emphasis on the cultural variance and non-native English writer contexts.

Even though Johnson and Rozycki (2010) do have two non-native English writings in their corpus selection, the selection was by chance as their corpus targeted the best six IEEE papers. It is unknown if there is any other study on Computer Science articles that have non-native English writers as a focus in their corpus selection. With this prospect in view, the focus of this study is narrowed down further to non-native English writers, specifically Malaysian writers.

2.8.2 Rhetorical Strategy Variations By Non-Native English Writers

Studies on the research article writings by non-native speakers of English have been conducted by many researchers, without specification to any nationals (Gosden, 1995, Dong & Xue, 2010, 2010, Kourilova, 1998 , Flowerdew, 2001). Studies focusing on specific nationalities were on Czech writers (Cmejrkova, 1996), Persian writers (Atai & Falah 2005), Finnish-English (Mauranen, 1993 in Williams 2006), Spanish- English (Williams, 2005 in Williams 2006), and Indonesian writers (Adnan, 2005; Mirahayuni, 2010; Safnil, 2014). While there are similar findings that indicate universal problems as highlighted by Flowerdew (2001) on rhetorical structure, subject-verb agreement (Pho, 2008), and cohesion devices (Kourilova, 1998); researchers also found problems and characteristics which are uniquely related to the nativity and the socio-cultural aspect of the writers.

One of the studies that focused on the nativity and socio-cultural aspect of the writer was by Sheldon (2011) who compared the rhetorical strategies in research articles written by 18 native English writers, 18 English second language writers and 18 Spanish writers.

The native English writers were found to adhere to the moves in the CARS model (2004) at a better percentage compared to the English second language writers. While the English second language users and Spanish writers were found to have better percentages of realization in *Announcing the present work descriptively or purposively*, the English native speakers performed better than the other two groups in realizing the moves of *Announcing principle findings* and *Stating the value of the present research* (p.245). The English second language writers and the Spanish writers were reported to be more "restrained and cautious" (p.246) in announcing the findings of their studies. They preferred to portray their studies purposively and descriptively instead of making "strong claims for the validity of their research" (p.246). Avoidance of *Announcing the principle findings* and *Stating the value of the present research* have been empirically presented. While the study has described the moves used by Spanish writers, little is known on how these moves are utilized by Malaysian writers.

Another study that focused on the nativity and socio-cultural aspect of the writer was by Kourilova (1998). The study examined 80 manuscripts of research articles with the intention to identify the application of communicative and genre conventions expected in the discourse by Slovak writers. The study reported that a lack of insight on the use of "pragmatics of epistemic modality tools for projecting honesty, modesty, caution, and politeness" was identified among Slovak writers (Kourilova, 1998, p.113-112). As a result, the Slovak writers were "frequently accused of being pretentious, overconfident, and unjustifiably conclusive". Following the finding, Kourilova (1998) cautioned the non-native English writers to develop "sociocultural sensitivity" and linguistic competence to "fit in both professionally and socially as members of the scientific

community" (p.114). While the findings by Sheldon (2011) and Kourilova (1998) indicated that variations do exist in the research articles written by the Spanish and Slovak writers, little is known if Malaysian writers are also facing the same problems.

Studies that highlighted the differences in the strategies used by non-native English writers were conducted on the English research articles written by Indonesians. Adnan (2009) and Safnil (2013) used the CARS model (1990) in the study and looked at 30 and 63 research articles respectively. Both studies concurred that the Indonesian writers used fewer references, and citations were used less frequently than expected where only 36% of the research articles established the niche of the study in the Introduction section (Safnil, 2013). Appallingly, the usage of strategy on positioning and situating the study amongst existing studies, which is obligatory in the writing model (Swales 1990, 2004), were significantly low (Adnan 2009). Both writers warned that the low use of Critical review in the research articles written by the Indonesians was real and could result in difficulties of publishing in journals abroad.

On top of the caution issued by Adnan (2009) and (Safnil, 2013), Rakhmawati (2013) also warned that while the English research articles written by Indonesian writers followed the common structure of the Introduction-Methodology-Result-Discussion the writers used many sub-sections and also had additional sections, namely the Conclusion section and the Suggestion section. Such phenomenon is accredited to the common practice of the discourse community which expects research to provide a direct solution to an identified problem of the community. In spite of the fact that the practice of making extensive conclusions and giving suggestions meet the expectation of the Indonesian research community, Rakhmawati (2013) warned that such practice is also a sign of

lacking awareness either by the writers or the editorial board members on global reader expectations. While such findings of the studies (Adnan, 2009; Rakhmawati, 2013; Safnil, 2013) enable caution and advice to be given to the Indonesian writers, instructors and editors on the critical areas of rhetorical strategies; such advice is underprovided for Malaysian writers, instructors and editors particularly when not much is known about the rhetorical strategies used by the Malaysian writers in research article writing.

Consistent to the findings of the mentioned studies (Adnan, 2009; Rakhmawati, 2013; Safnil, 2013; Sheldon, 2011; Kourilova, 1998) on the different rhetorical strategies used in research articles by non-native writers, researchers Dudley-Evans (2000) and Pho (2008) highlighted the need to investigate the cultural variation in research articles. Dudley-Evans pointed out the need for such an investigation, particularly when non-native writers do not have the high proficiency level in English that most students have and many of the non-native writers "do not have the linguistic sophistication to deal with issues about the readership and the discourse community in any depth". Therefore a straightforward approach is needed, notably "They need to see how the Moves and Steps work in the genres they use and how they are expressed in English" (Pp.9-10).

Pho (2008, p.1) gives a similar view that non-native English research article writers do face many difficulties and therefore an investigation of the rhetorical structure on research articles written in English published in prestigious international journals is needed as such information will "assist non-native speakers in writing more acceptable papers".

In the Malaysian context, linguistic study on scientific writing has been taken up by a few researchers (Ahmad 1997, Holmes 1997; Holmes and Asmahan, 2002; Lim, 2009, 2010, 2011, 2012a, 2012b; Singh, Shamsudin and Zaid, 2012, Ibrahim and Nambiar, 2012) but little is known about the rhetorical strategy of research articles by Malaysian Computer Science writers. Ahmad (1997) examined 62 Malay research articles using the CARS model version 1990 by Swales. The study reports that the Malay writers "rarely pose challenge to others' work" (p.182) and show "little evidence of self-promotion" in the Introduction section. While Ahmad reported the low usage of promotional strategy amongst the Malay writers, Shehzad (2010) reported the high usage of promotional strategy in the Computer Science research articles; so these two contradicting possibilities pose uncertainty on how Malaysian writers fare in using promotional strategies in Computer Science research articles.

Another study on research articles in the Malaysian context is by Singh, Shamsudin and Zaid (2013). The study examined the COREWIC corpus consisting of 90 work procedures in the form of written communication used in the Malaysian petroleum industry. Notably the study focused on the application of Bhatia's genre analysis on the COREWIC corpus which was found to be useful in qualitative analysis. The study found the moves for the core components which could be used as the guidelines in developing teaching instructions for English for Special Purpose in the petrol and chemical engineering areas. While understanding that the reality of the text is useful in preparing guided instructions has been highlighted (Singh, Shamsudin & Zaid, 2013) understanding the reality of the moves used in research articles by Malaysian academicians is still lacking.

Other studies in Malaysia were done by Lim (2009, 2010, 2011, 2012a, 2012b) and the studies were on various disciplines without zeroing onto the Malaysian group. In the study Lim (2012a) examined how rhetorical steps are used in the Introduction section by experienced writers. The findings showed that some of the prevalent moves indicated the research gap, and "adding to what is known". While the studies highlighted the strategic deployment of the moves in research articles, the studies were on research articles from the Management discipline (2012a), Applied Linguistics (2012b; 2011, 2010, 2009), and Education (2011, 2010, 2009) without focusing on the nativity of the writers. So information on the deployment of rhetorical strategies in research articles by Malaysian writers remains uncertain.

Another study done in the Malaysian context was by Homes and Asmahan (2002) who examined 100 conference abstracts which were submitted to a teacher conference held by Universiti Teknologi Malaysia. The abstracts were a mixed group of Malay and English abstract written by Malaysians, and English abstracts written by Australian writers. Apart from finding that the Australian abstracts contained fewer sentences than the abstracts written by the Malaysians, the absence of "Indicating a gap" was also detected in the Malay abstracts which concurred with the finding by Ahmad (1990). Holmes and Asmahan suggested that this avoidance was transferred to the English texts. The study by Holmes (1997) was concerned with the Social Science discipline without narrowing on the Malaysian writers. While the studies give a good description of the use of rhetorical strategies in scholarly writing by academicians in Malaysia universities, neither of the studies focused on the Computer Science discipline as intended in this study. Reflection on the studies (Ahmad, 1997; Holmes, 1997; Holmes and Asmahan, 2002; Lim, 2009,

2010, 2011, 2012a, 2012b; Singh, Shamsudin & Zaid, 2012; Ibrahim & Nambiar, 2012) investigated this study to focus on the rhetorical structures in Computer Science research articles by academicians in Malaysian universities.

2.8.3. Rhetorical Strategy Variation In Research Articles Of Other Languages

Studies on research articles written in other languages have been conducted, such as in Arabic (Najjar 1990), Spanish- English (Moreno, 1997, 1998) , Malay (Ahmad, 1997), Thai (Jogthong, 2001, Kanoksilapatham, 2007), Persian (Zarei & Mansoori, 2007), French (Van Bonn & Swales, 2007), Arabic (Al-Harbi & Swales, 2011), Turkish (Karahan, 2013), pairs of English and other language (Swales & Perales-Escudero, 2011).

Another Study on research articles written in the Indonesian language was done by Mirahayuni (2002) who compared the research articles written by native English writers, Indonesian writers in English and Indonesian writers in the Indonesian language using the move analysis. Each group was represented by 20, 19 and 19 research articles respectively. Significant differences were found and it was suggested that the differences were caused by the influence of writing practices in the Indonesian first language. One of the differences was in the absence of citation. While citation has been indicated as an important strategy in establishing the research topic (Swales, 1990; 2004) Mirahayuni (2002) found that only half of the Indonesian subjects used this step whereby it was elaborated that the Indonesian writers used fewer references and citations compared to native writers. As mentioned earlier, such an absence has also been reported in the English research articles written by Indonesian writers (Adnan, 2009; Safnil, 2014). Interestingly, Mirahayuni (2002, p.73) reported that English research articles written by

the Indonesian writers were found to show strategies which were different from both the native English and the native Indonesian texts. Compared to the research articles written in the Indonesian language, the English research articles written by the Indonesians have greater attempts of including background information and report on the research outcome. While the English research articles were also found to have more references, gave more explanations and exemplifications, the English research articles were also found to make lesser attempts in giving recommendations for future studies and pragmatics compared to research articles in the Indonesian language. In short, even though writing habits in the native language may influence English writing, significant differences exist in research articles written in the native language and in English (Mirahayuni, 2002). Such possibilities suggest the need for a more comprehensive view on the research articles written by Malaysians. The existing study by Ahmad (1997) on the research articles written in the Malay language need to be complemented with more studies on a different perspective, particularly in the area of research articles written in English by Malaysian writers.

Similar to Indonesia, Thailand also has numerous studies that served as cautions and advise to the Thai writers, instructors and editors (Jagthong, 2001; Kanoksilapatnam, 2007). Jagthong (2001) examined 40 Medical and Education research article introductions written in Thai using the CARS model version 1990. While the moves in the CARS model were matched, the steps were less consistent with the model. The study found that the Thai research articles had less realization in "Announcing the principle outcomes" but had an additional move of indicating the implications of the research. The Thai writers were also reported to avoid criticizing and evaluating the words of others. In

the discipline aspect, the Medical research articles were found to have more English code mixing with Thai compared to the Education research articles.

The study by Kanoksilapatham (2007) was on 60 research articles in English and 42 research articles written in Thai. It was noted that in realizing the move for "Preparing for the study" the English research articles were found to use "critique culture" by "specifically pinpointing the flaws of previous studies" (p. 199) whereas the Thai writers preferred to justify the study by highlighting the absence of similar studies. Notably, none of the research articles in Thai "negatively evaluated" previous studies. The "lacking of critique" strategy was attributed to the respect for seniors who are respected in the Thai culture (Kanoksilapatham, 2007:199). Absence of critical review in the research article writing was also reported among Indonesian (Safnil, 2000), Arabic (Fakhri, 2004) and Persian writers (Zand-Vakili & Kashanu, 2012). The reasons given were the small size of the discourse community (Sheldon, :245), "ignorance on the part of the scientific community" , avoidance from "invoke (invoking) a negative attitude from other researchers" (Hirano, 2009, p. 245).

The pilot studies result for this investigation also found deficiency in an important rhetorical strategy in the writings of Malaysian writers. Announcing the principle findings is a strategy that is not only common in the English research articles but also is reported to becoming a trend in research article introductions (Shehzad, 2010b). The findings of studies in 1987 reported occurrences at 55% (Swales and Najar, 1987), 70% in 1999 (Pesteguillo, 1999) and 73% in 2010 (Shehzad, 2010b). However, the pilot study conducted for this research also found an alarming absence of such a move was only at 20%.

Despite the fact that there is much evidence and many findings reported the studies hardly focused on the rhetorical strategies used by Malaysian academicians. For this reason, this study intends to find out the rhetorical strategies used in Computer Science research articles written by academicians in Malaysian universities.

In summary, this chapter begins with the historical overview on research article writing. Then, the approaches used by other writers in conducting research article writing were discussed and the chosen approach which is related to move analysis, the CARS model (Swales, 2004), was explained. The previous studies that used the approach were also described along with the studies on the research on research articles across disciplines, research articles written by non-native English writers and research articles written in other languages.

In the next chapter, the methodology used for the study is explained beginning with the presentation of the qualitative epistemology and then the textual analysis and the justification for using the textual analysis is presented. The research article sampling and the justification for the sampling is explained after which the interrater process for the textual analysis is described. The interview for further data collection is also described and the rational for the interview is given. In chapter 3, the explanation on the pilot study conducted is given, mainly on the purpose, the findings and how the pilot study influences the main study.

CHAPTER THREE

METHODOLOGY

3.1 Overview

This chapter begins with the epistemology of qualitative analysis (3.2) and then the research framework (3.3) is presented, followed by the corpus of the study (3.4) where the explanation for the sampling for the research and the choice of sampling is justified. Next, the move analysis (3.5) process is described and after that, this chapter proceeds to explain the reliability of the study (3.6) the description and rational for the interview (3.7) used in the study is presented. The chapter ends with the description of the pilot study conducted (3.8) and finally discusses how the pilot study influences the main study.

The purposes of this study are to:

1. Investigate the moves and steps typically found in the research article introductions in the Computer Science discipline that are written by academicians in Malaysian universities.

2. Investigate the extent of conformity to the CARS model (Swales, 2004) in writing Computer Science research article introductions by academicians in Malaysian universities.

3.2 Epistemology of Qualitative Research

Denzin and Lincon (2000, p.2) highlighted that Positivists presumed that "a stable, unchanging reality can be studied with empirical methods" and criticized qualitative researches as "unscientific, only exploratory, or subjective." Qualitative researchers were further described by the positivists as fiction writers, not science writers and "have no way of verifying their truth statements" (Denzin & Lincon, 2000, p.2). Denzin and Lincon (2000) refuted that qualitative research involves the interpretive approach where the researches are done in their natural settings, "attempting to make sense or interpret phenomena in terms of the meaning people bring in them".

Merriam (2002, p.4) also argued that qualitative researchers work on understanding "constructions and interpretations of reality" and these interpretations may "change over time". In relation to the interpretations that may change over time, this study investigates rhetorical strategies in research articles which concern a phenomenon that is dynamic, ever changing and driven by the expectation of the readership. Swales (2004) states that research articles undergo dynamic progress which is offset by the development of research article writing in terms of structure, readership and purpose. With such dynamism and changing reality that requires deep interpretation of rhetorical strategies in the text, the postpositivist view on research is adopted. While these interpretations may "change over time" even so, as suggested by Merriam (2002, p.4); qualitative researchers look at the interpretations "at a particular point in time and in a particular context".

Qualitative research suits the investigation on the rhetorical strategies which are complex and cannot be measured easily. Cresswell (2013, p.48) suggested that qualitative research can be conducted for "complex, detailed understanding of the issue" and "identify variables that cannot be easily measured". The problems of rhetorical strategies need to be explored qualitatively mainly because the problem cannot be measured on a scale. While the quantitative instrument of survey in the Likert scale can gather the perception of the writers and instates representativeness, the Likert finding would only give the writers' perceptions or beliefs on the strategies that they used but the realistic picture on the rhetorical strategies used by the writers is far more complex and need to be studied in depth. Therefore qualitative research is carried out to explore the rhetorical strategies in the real text and only from there the real problem can be identified.

According to Cresswell (2013, p.48), qualitative research is conducted because the researcher wants to "empower individuals", listen to the voices of the subjects and have their collaboration "during data analysis and interpretation phases" of the study. In this study, the voices of the writers are important as they provide the justifications as to why the rhetorical strategies were used and why some strategies were avoided. Therefore qualitative research is utilized to enable the writers' voices to be heard and considered in establishing an in-depth understanding on the phenomena. On top of the advantage of having the writers' voices, qualitative research also enables the computer scientist to collaborate in the study. The computer scientist plays the role as the interrater and also as the

expert that advises which article belongs to the Computer Science group and which article is multidiscipline.

While models and theories explain the general picture of trends and relationships, the models and theories cannot explain the real experience in the context and why people responded as they did. Peoples' behaviour and thoughts that govern the responses and qualitative research help to "explain the mechanisms or linkages in casual theories or models" Cresswell, 2013. p. 48). In relation to this study, while genre analysis theorizes that "members of specific discourse communities construct, interpret" according to their "disciplinary practices, procedures and cultures" (Bhatia, p.6). Further research needs to be conducted to find answers for Computer Science research article writing and to find answers as to why the writers write the way they do and for this reason, quantitative research is conducted to find the real condition of the phenomenon.

According to Sullivan (2001, p.98) qualitative research is "more exploratory in nature" and the result is "descriptive, possibly resulting in the formulation rather than the verification of hypotheses". In relation to this study, the employment of move analysis of the research article is indeed exploratory rather than the verification of hypothesis. This study does not intent to prove or disapprove the models or any hypothesis but rather investigate the rhetorical strategies utilized by the Computer Science research article writers. Even though the findings of the move analysis are presented in percentages, the findings are explained descriptively in order to capture the meaningful and significant phenomenon in the utilization of rhetorical strategies in the Computer Science research articles.

Apart from identifying the rhetorical strategies in use, the various ways the realization was made are also described.

In tandem to the dire need to increase the quantity and quality of research article publication, easier ways to write research articles were studied globally on a large scale (Aksnes & Rip, 2009; Antonakis, Bastardoz, Liu, & Schriesheim, 2013; Didegah & Thelwall, 2013). Although, many studies have investigated research article writing, many of these studies used the quantitative methodology (Aksnes & Rip 2009; Ansarin & Bathaie, 2011; Antonakis, Bastardoz, Liu & Schriesheim, 2013; Didegah & Thelwall, 2013), focusing on bibliometric studies and linguistic descriptors and structures (Duncan, 2008; Hyland, 1995; Karahan, 2013; Lin & Evans, 2012). On the contrary, this study employs the qualitative research methodology as the emphasis is on the rhetorical moves as previous studies have indicated that the rhetorical strategy was one of the more challenging problems than the lexicogrammar area (Bhatia, 1993; Jeffery, Kieffer & Matsuda, 2013; Swales, 2004).

Even though a reasonable number of studies employed the qualitative methodology (Cummings, 2012; Holmes, 2012; Noudoshan, 2012), the models used for these studies were varied such as the Yang and Allison's Seven-Move model (Noudoshan, 2012) and the Contrastive Rhetoric (Cummings, 2012), the Move Model by Hopkins and Dudley-Evans (Holmes, 2013), and the Move Model by Ngowu (Malik & Nesi, 2008). Although the studies produced many findings, the different models used, make comparison of the findings between

the studies difficult, particularly when the constructs used for the move analysis were inconsistent from one model to another.

3.3 Research Framework

Genre analysis has been established over the decades and has been identified as a suitable methodology for academic text analysis (Flowerdew, 2002; Connor, 2004, Bhatia, 2002). This study integrates the genre analysis method, with the Biber Connor Upton (BCU) Approach as commended in Upton and Cohen (2009). The "Top-down move analysis" using the BCU approach (Upton and Cohen, 2009, p.5) is employed. The functional categories for the move analysis are from the Introduction-Method-Result-Discussion structure (section 2.3), and the CARS model (Swales, 2004) (section 2.6). The analyses are conducted on the research articles at the macro- and micro-levels and then the data are triangulated with the data from the interviews with the selected writers. The following section describes the research design and the procedures.

The framework of the study can be summarized in Figure 3.1 It started with choosing 120 research articles. The sampling procedures on choosing the 120 articles are described in detail in section 3.2.2 Sampling. The next step was to conduct the move analysis on the research articles at the macro- and the micro-levels using functional categories from the Introduction-Method-Result-Discussion structure and the CARS Model (Swales, 2004). The macro-level looked at the overall structure of the article as discussed previously in the Introduction-Method-Result-Discussion section 2.2 and the micro-level analysis looked deeper into the Introduction section in the aspect of rhetorical strategies

as in CARS (2004) as explained in section 2.4.5. As a measure to increase the "credibility of an account" of the study (Creswell and Miller 2010:125) an interrater from the Computer Science discipline carried out a move-step analysis on 50% of the corpus. The interrater process is explained at length in section 3.5.2.

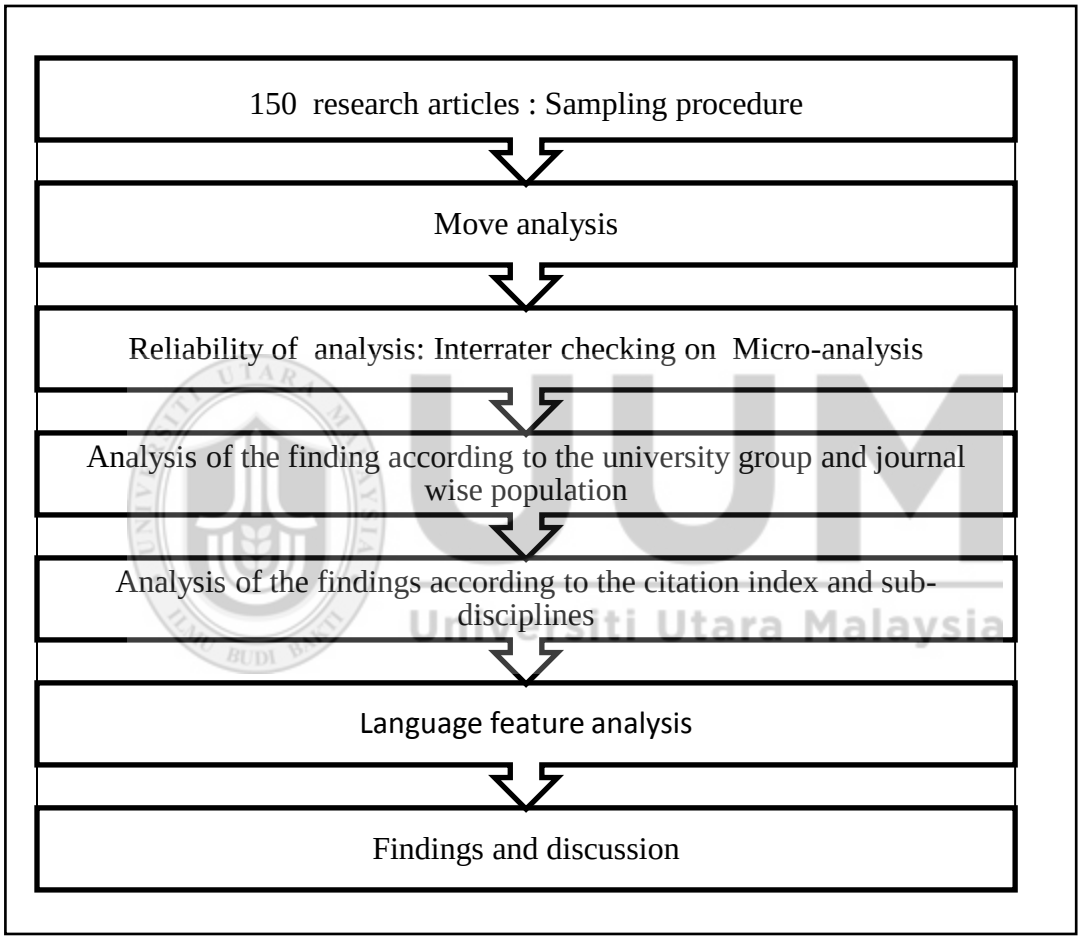

Figure 3.1. Research flow

The steps and moves that emerged from the move analyses were compared and triangulated with data from the interviews with 4 writers. The interviews were done to substantiate the emerging patterns and the missing strategies with justifications from the writers.

The move analysis findings enabled comparison to be made with the findings from other studies that had also employed the Swales CARS model (1990, 2004) to gain insights into the similarities and differences of the writing strategies employed by the Malaysian writers compared with other global writers. The comparison facilitated a detailed description of the generic structure of the articles. This procedure garnered the detailed description of the research article structure, missing rhetorical strategies and or overly elaborated rhetorical strategy.

A pilot study was carried out on five computer engineering research articles. Taking heed of the findings of the pilot study, the research questions were reaffirmed as below:

RQ 1. What are the moves and steps typically found in the research article introductions in the Computer Science discipline that are written by academicians in Malaysian universities.

RQ 2. To what extent do the academicians in Malaysian universities conform to the CARS model (Swales, 2004) in writing Computer Science research article introductions?

3.4 The Corpus of the Study

150 articles were chosen because the data gathered from the articles have reached saturation. Patton (2002) stated that sample size can be affected by "the purpose of the inquiry" which in this study refers to "identify patterns across

data". This study wanted to know what the moves were and the steps being used in the articles and how they moved and the steps were realized. As suggested by Patton (2002), the articles were selected and added. Initially, the analysis of the articles indicated some patterns that led to categories of how the moves and steps were realized. More articles were added until the analysis showed that new articles no longer generated new patterns and categories on how the moves and steps were realized. After analysing 120 articles, the patterns on how the moves and steps were realized became regular and predictable. For example, in the analysis of Move 2 Step 1A, four categories were identified. After adding more articles up to 150, the categories became consistent and no new categories emerged because the patterns could just fit into the existing four categories. Similar consistency was noted in the categories for the other moves and steps upon reaching 150 articles. The data reached saturation at 150 articles. No pattern or category emerged from the addition of articles and therefore the size of the corpus consisted of 150 articles.

This study employed purposive sampling that demanded parameters of the population to be considered in choosing the case (Silverman, 2010). The parameters were identified as in group, settings, and individual where the processes being studied were likely to occur (Silverman, 2010).

The corpus of the study consisted of the Computer Science research articles written by academicians in Malaysian universities which were listed in Scopus as in August 2010. Following the notion on qualitative study sampling (Denzin and Lincoln, 1994, Silverman, 2010) this study stands that, even though the

number of the sampling which was only 120 appears smaller than other quantitative studies; being qualitative the focus of the study was to get an in-depth understanding of the phenomenon. The move analysis depth of this study was established by comparing the similarities and the differences across the contexts and resources gained from numerous previous studies. The corpus of the study consisted of Computer Science research articles written by academicians in Malaysian universities as listed in the Scopus database for the year 2010.

The list of the intended journals was generated from the Sci Verse Scopus database using the following steps. First, the list of private and public universities was obtained from the Ministry of Higher Education website. The Ministry of Higher Education website listed 20 public universities and 25 private universities (the Ministry of Higher Education, 2011). The lists of the universities are displayed in Table 3.1. Next, the number of SCOPUS publications by each of the 45 universities was retrieved from the SCOPUS database system. This information was obtained using the affiliation search function and the spellings used on the Ministry of Higher Education website.

The affiliation search did not include some university branches such as the search for Universiti Kebangsaan Malaysia excluded the Faculty of Medicine of Kuala Lumpur Hospital and the Universiti Kebangsaan Malaysia Hospital in Cheras. The same was applied for the search on Universiti Sains Malaysia which did not include the Faculty of Medicine, Hospital Universiti Sains Malaysia. The reason for this exclusion was this study focused only on the writings of the

Malaysian academicians. It was necessary to exclude the hospitals in the affiliation search to avoid the writings by the group of medical practitioners whose interest was more in the practice of medicine. Moreover the main focus of this study was on the Computer Science discipline.

Since the number of publications consisted of various documents such as articles, conference papers, reviews, articles, short summaries, conference reviews, editorial reviews and even notes, the search was narrowed down further to research articles only. But the number obtained included the number of articles in various fields. As this study focused on Computer Science, the search was narrowed down to Computer Science.

The next step involved excluding articles in multidisciplinary areas because such inclusion also included articles other than those in the Computer Science discipline. It is also important to take note that this study focused on Computer Science SCOPUS articles published in 2010 which was the most recent year as the publication for the year of 2011 had not been compiled when this study started.

The total number of publications by each university on the database was traced from 1949 to August 2011. The information obtained is summarized in Table 3.1.

Table 3.1

Number of Scopus Research Articles by Public Universities

Malaysian University Groups	**Name of Malaysian University**	**Numbers of Documents**	**Number of Articles on Scopus**	**Number of Articles in 2010**
APEX University	USM	10,966	8,625	1722
Group total	1	10,966	8,625	1,722
Research	UM*	488	389	37
University	UM**	13,427	10,664	1768
	UKM	8,477	5,898	1,111
	UPM	10,148	8,082	1,592
	UTM	5,071	2,319	580
Group total	4	37611	27352	5,088
Comprehensive	UIAM	1,861	1,177	257
University	IIU*	1,787	1,103	286
	UNIMAS	921	634	110
	UMS	1016	691	150
	UiTM	2976	1,284	334
Group total	4	8561	4889	1137
Focused	UPSI	115	68	19
University	UUM	368	184	48
	UTHM	638	220	70
	UTeM	360	85	28
	UMP	499	259	94
	UniMAP	888	354	89
	USIM	48	25	13
	UMT	533	414	98
	UniSZA	No record	No record	No record
	UMK	23	21	12
	UPNM	43	16	9
Group total	11	3,515	1,830	480
Grand Total	20	60,653	42,696	8,427

Universiti Malaya (UM)*
University of Malaya (UM)**
Universiti Sains Malaysia
Universiti Kebangsaan Malaysia
Universiti Pertanian Malaysia (UPM)
Universiti Teknologi Malaysia (UTM)
Universiti Islam Antarabangsa (UIAM)*
International Islamic University (IIU)**
Universiti Utara Malaysia (UUM)

Universiti Malaysia Sarawak (UNIMAS)
Universiti Malaysia Sabah (UMS)
Universiti Pendidikan Sultan Idris(UPSI)
Universiti Teknologi MARA (UiTM)
Univerisiti Malaysia Perlis UniMAP
Universiti Sains Islam Malaysia (USIM)
Uni Sultan Zainal Abidin (UniSZA)
Universiti Malaysia Kelantan (UMK)
Uni. Pertahanan Nasional M'sia (UPNM)
Universiti Malaysia Terengganu (UMT)
Univeresiti Tun Hussien Onn(UTHM)
Univ. Teknikal Malaysia Melaka (UTeM)
Universiti Malaysia Pahang (UMP)

Table 3.1 shows that the Malaysian public universities have a total of 60,653 documents on Scopus database where 70.4% or 42,696 of the documents were articles. 29.6% were other documents in categories of conference papers, reviews, articles in press, editorials, short surveys, erratum, notes and other undefined types. The Malaysian public universities have published an average of 3,033 documents per university totalling 60,653 documents in the Scopus database dated from 1949 up to 2010. Computer Science articles made up 4.5% of the number of articles published by the Malaysian public universities in Scopus totalling 3318. 33.6% or 643 of the Computer Science articles were published in 2010.

In the beginning, it was found that the APEX and the Research Universities surpassed the average except for Universiti Malaya which fell short at 488 articles only. Upon further checking, it was discovered that most of the papers published by Universiti Malaya were under the English name which was University of Malaya instead of Universiti Malaya as registered in the Ministry of Higher Education official website. However, the name, University of Malaya, has long been used and is widely popular. In fact, the existence of the university

began with the English name. Therefore the English spelling was also used to obtain the statistic. Apart from that, International Islamic University Malaysia was also included in the statistics because of the history behind the university set-up which was linked to the Saudi government and also its establishment in relation to other International Islamic Universities in other parts of the world such as the International Islamic University of Chittagong. The names of the other universities were according to the list given by the Ministry of Higher Education. This is reasonable as the names in the Ministry of Higher Education record are the official registered names which are also submitted for global university ranking purposes such as the Times Higher Education World University Ranking and the QS World University Rangking (Masron, Ahmad & Rahim, 2012). Consideration of the various types of affiliated names opened too many variations. Various variations also resulted in overlaps whereby some of the articles appeared more than once in the search and therefore distorted the real figure.

Table 3.2 shows the percentage of the articles written by each university group. Research University produces the biggest number of articles; 340 articles or 42% of the total. Apex University which is USM, produced 96 articles or 12% of the total. The Comprehensive and the Focused groups produced 133 (17%) and 74(9%) articles respectively. The rest of the articles numbering 160 (20%) were produced by the private universities.

Table 3.2

Number of Computer Science research articles used in the study

Name of Malaysian University	Number of Computer Science articles	Number of Computer Science articles in 2010	Number of Samples
USM	355	96	17
UM	338	58	15
UKM	294	87	11
UPM	390	108	28
UTM	298	87	23
UIAM	218	54	9
UMS	26	1	1
UNIMAS	38	9	1
UiTM	113	69	5
UPSI	3	1	0
UUM	31	8	2
UTHM	30	12	4
UTeM	15	5	2
UMP	31	14	3
UniMAP	46	12	3
USIM	2	1	0
UMT	37	17	4
UniSZA	No record	No record	0
UMK	0	0	0
UPNM	4	4	2
AIMST	0	0	0
MUST	0	0	0
MSU	6	0	0
MMU	861	88	10
UNISEL	1	1	1
UNIKL	3	2	1
IMU	1	0	0
LUCT	0	0	0
UTP	52	18	2
UNITEN	49	18	2
WOU	0	0	0
PINTAR CAMPUS	5	0	0
UTAR	69	32	3
UCSI	2	1	1
11 more universities have no record of Scopus publication			
Total 45	3318	803	150

The type of university was according to the Ministry of Higher Education and the type of university signified the funding size received, the number of academic staff and postgraduate students, the size of the faculty and available resources. These factors influence publication performance (Masron Ahmad & Rahim, 2012). This study categorized the writers into the different types of universities that the writers came from or, in simple words, according to the university affiliation because the group of the university determined the research role and the funding assigned. The study wanted to investigate if there were any differences in employment of rhetorical strategies when the writers were affiliated with universities that had bigger research roles and bigger research funding.

The articles were categorized according to the university groups such as Accelerated Program of Excellence (APEX) university, Research Universities, Comprehensive Universities, Focus Universities and Private Universities. The group of the university is important because it determines the research role and the funding assigned, for example, the Research universities are designated to produce a bigger number of research and are allocated more funds (Aizan, Rosna, Nurahimah, Chan and Doria, 2014). The importance of research to this university group is evident even during the application stage to be in the Research University group where 80 percent of the evaluation is on the quality and quantity of the research (Bakri and Willet, 2011). While the APEX university is given the autonomy in finance, service scheme, management, student intake and a few other areas, the Private universities, on the other hand,

are assigned more operational roles such as "expand interest in and build research and development skills among the teaching staff and promote collaboration between private and public universities" (Lee and Fauzian, 2014). In short, while all university groups place importance on quality research, the emphasis on competition is top in the groups. Such competition poses a question as to whether the writers from these top university groups are employing more "promotional strategies" (Shehzad, 2010) compared to those in the groups receiving less publication commitments. Even though there are studies that describe the various roles and funding assigned to these university types (Maidin, 2010; Masron, Ahmad, & Rahim, 2012), investigation on how having different roles on research held by these university groups affect research writing is still limited. For this reason, the university group is included as a criterion in the selection of the Malaysian Universities Computer Science Scopus Articles corpus.

Out of the 150 samples, 17 articles were taken from the APEX University, 77 from the Research University group, 16 from the Comprehensive University group, 20 from the Focus university group and 20 from the private universities. Initially, 80 research articles were chosen according to the percentage of papers written by the universities. Next, as the research developed, more articles were added. 38 research articles were from the Pertanika journal and 14 were from the Malaysian Journal of Computer Science journal. Then, 18 research articles were

added to give the data for highly cited research articles. Finally the total came to 150 research articles.

3.4.1 Scopus Research Articles

Shehzad (2005a) suggests that a corpus should be authentic and follow specific criteria and be taken from high ranking journals as the high rank reflects the publication's soundness. On the same note, the research articles in this study were taken from the Scopus indexed database.

Even though the assumption that research articles from the Scopus database have been edited to conform to the international standard it may not reveal much differences in the writing of the Malaysian writers. For pedagogical purpose, it is still necessary to obtain empirical descriptions on the utilization of the moves and steps in the writings of the Malaysian writers in the target publication. For pedagogical purpose, this study is not to establish the differences, but rather to establish an understanding of the practices, particularly on the moves and steps that are practiced among Malaysian writers and how the moves and steps are achieved in the target publication. Scopus is identified as the target publication because of the recognition given by the Malaysian Ministry of Higher Education through directives communicated to the academicians on various occasions (JPT, 2010; Ministry of Higher Education, 2011; Department of Higher Education, 2012). The recognition is evident in the initiatives taken by various Malaysian universities which include rewarding the writers in the form of 'seed money' or research grant with every Scopus article published (UniMAP, 2011; UniMAP, 2012). Moreover, Scopus has also been recognized as an acceptable

return of revenue for various research grants such as the Fundamental Research Grant (FRGS) and the Experimental Research Grant (ERGS). In short, many researchers target Scopus as the platform for their article publication. However, language teachers who are not members of the technical profession have been warned that they are, "not qualified to help students think and write like historians, engineers, agriculturalists or economists"; instead teachers should look at "the writing demands" that the "students will face after they leave" and to consider how to "help to prepare them for those demands" (Leki, 1994, p. 82). Therefore, it is important to understand the demands of the target publication. In preparing the students to meet those demands, it is necessary to understand which moves and steps are being favoured and which are being underutilized by the Malaysian writers. The excerpts derived from the analysis of how the moves and steps have been achieved, would provide real practice writing samples for the instructors and the learners. While studying articles written by global writers may also give high standard examples, such a sampling would not give information on which move and steps are being avoided by the Malaysians writers. Such information is important as identification on moves and steps being avoided indicates the challenging strategies and such challenges should be addressed with more emphasis by the learners and the instructors. The description on the techniques of realizing the moves and steps provides the teachers and the learners with perspectives on how the Malaysian researchers have managed to fulfil the global writing expectations. The excerpts from the Scopus articles provide samples on how these challenging moves and steps have

been realized in the target publication and this would further help teaching and learning. If the study uses articles from non-Scopus database, the samples derived from the non-Scopus articles may not be suitable for learners who aim to publish in the Scopus indexed journal.

The selection of journal articles from Scopus gives the impression that the articles are less problematic as the articles have conformed to international standards and have been reviewed by blind reviewers. However, this study focuses on describing the common and underutilized rhetorical strategies employed in the Scopus articles, rather than highlighting the various mistakes in the research articles in local journals or articles that have not been published. It focuses on the description rather than the differences because the description on the practice would help to understand the application and the limitation of the existing CARS model in pedagogy, particularly in the Malaysian context. By choosing Scopus articles, the description on the techniques used to realize the moves and steps in the actual target publication can be identified. Identification of the techniques used by the players in the target publication is also supported with excerpts from the research articles which can be used as writing samples. While the writers may have conformed to the international standard set by Scopus, descriptions on the extent of conformity and the techniques used to achieve conformity are necessary for pedagogical purposes. In short, rather than focusing on differences, this study focuses on the description to understand the applicability and limitation of the existing model in the context of Malaysian writers.

Scopus was introduced by Elsevier in 2004 (Vieira and Gomes, 2009). The Scopus database has a collection of over 15,000 peer reviewed journals from more than 4,000 international publishers, including 1200 Open Access journals (Scopus, 2008). Sci Verse Scopus is a database that holds abstracts and citations of peer-reviewed literature and quality web sources (Scopus, 2012).

Access to the Sci Verse Scopus database and search engine is through subscription only and the owner of the database, Elsevier, is also one of the main scientific journal publisher. To minimize potential conflict of interest in the choice of listing, the coverage of listing in the database was done by Scopus Content Selection and the Advisory Board whose members are scientists and librarians of various scientific disciplines and from various countries (Scopus, 2010).

The Sci Verse Scopus indexes the abstracts and titles for various types of documents including reviews, journal articles, conference papers, short surveys, editorial comments, Erratum and many other undefined categories of documents (Scopus, 2010). This study focuses on the journals published in the Sci Verse Scopus database. The Sci Verse Scopus database was chosen because of the following reasons:

1) The Malaysian Ministry of Higher Education recognizes the scholastic journals published in the Scopus database. This recognition is evident through directives communicated to the academicians on various occasions (JPT, 2010, the Ministry of Higher Education 2011, Department of Higher Education, 2012).

Scopus and ISI journals have been mentioned again and again as a required target for publication.

2) Many universities in Malaysia want their academicians to publish in Scopus, ISI and impact factor journals and this aspiration is clear when some universities offer rewards to the writers in the form of 'seed money' or research grants. (UniMAP 2010, UniMAP, 2011).

3) Scopus has been recognized as an acceptable tangible return of revenue for research grants awarded by the main sponsoring bodies in Malaysia, namely the Ministry of Higher Education and the Ministry of Science, Technology and Innovation (MOSTI). Grants such as the Fundamental Research Grant Scheme (FRGS), the Experimental Research Grant Scheme (ERGS), the Long-term Research Grant Scheme (LRGS) being offered by the Ministry of Higher Education and the Science Techno Fund by MOSTI expect publication as one of the research outcomes to some extent; the publication translates into return of revenue for every Ringgit invested by the sponsors through the grant. The most desired publication is, of course, the High-Impact factor journals. These journals are most likely indexed by ISI-Thomson journals or by Scopus.

4) Scopus database is highly accessible and up-to-date. The data is laid out in an user-friendly environment making retrieval of information simple and fast. It has a simple and intuitive interface (Sci Verse, 2011). The user-friendly features such as the filter functions assist the sampling of the population for this study, particularly the Affiliation Identifier function which automatically identifies and

matches an organization with all its research output (Sci Verse, 2011). These functions enable information retrieval on the journal articles written by the authors in the affiliated universities. Information on the authors and the affiliation, combined with the year of publication give a perspective of the Malaysian University Scopus publication landscape. The information is in Table 3.1

5) On comparing Scopus to Web of Science and Google Scholar, Scopus was found to be more suitable to be used in determining the population for this study. Vieira and Gomes (2009) compared two major scholarly databases which were Scopus and Web of Science. They found that 2/3 of the documents referenced in any of the two databases while a fringe of 1/3 were only referenced in one or the other. However, the study done by Viera and Gomes (2009) was done "from a point of view of a typical comprehensive university" in Portugal. An earlier dated study by Falagas, Pitsouni, Malietzis and Pappas (2008), on the other hand, did a more comprehensive study and reported that their citation analysis showed that Scopus offered 20% more coverage than Web of Science, whereas Google Scholar was reported to offer results of inconsistent accuracy. In other words, Scopus is more likely to offer a bigger number of journals upon one search, hence the description of the population for the study has a lesser possibility of missing out any publication.

6) Scopus also covers a wider journal range compared to Web of Science and Google Scholar was described as "inadequate, less often updated, citation information" (Falagas et al., 2008). With a wider range of journals, the database

can generate a more comprehensive list of publication. In relation to this study, Scopus is a database which offers a more comprehensive coverage of journals, and gives the possibility of more accounts for population sampling.

7) There is a good potential for further research development through the merging of Sci Verse Scopus with Sci Verse Direct through the expansion of Sci Verse Hub. Sci Verse Hub provides one search engine for a wider landscape that combines the databases of Sci Verse Science Direct, Sci Verse Scopus and the web content. Apart from integrating the access from all three content sources, Sci Verse Hub illuminates duplication and ranked the findings by relevancy.

3.4.2 Research Article Selection

The Computer Science research articles derived from the Scopus database were further selected to create the corpus of the Malaysian Universities Computer Science Scopus Articles. Initially, the research article titles were derived from filtering the Scopus database but later in order to create the Malaysian Universities Computer Science Scopus Articles, these titles underwent further classification. The classification criteria were publication year was set to be in 2010 only, citation index, Journal wise population, expert identification, type of research universities, and non-Malaysian writers affiliated with Malaysian Universities. The reasons for these classifications are explained in the following sub sections.

3.4.2.1 Publication Year

The articles are only from 2010 because the journals already had stable citation counts. While articles from 2009 and 2008 were within the time range, they

were not chosen because the focus of the study was on the citation count instead of time range. The citation count was put in focus because this study wanted to compare the utilization of the moves and steps between the two groups of articles with high and low citation indexes. While intuition may suggest that the articles from both group with high and low citation indexes would not show much difference because both groups had been edited, an empirical analysis to confirm or to disapprove the intuition was necessary particularly when the CARS model (Swales, 2004) is to be used as a pedagogic tool. Descriptions on the application of this model by the writers from the two groups provide the teachers and learners with the accounts of the real practice. The findings indicated that there were some differences in strategy employment between these two groups (Ina, Aizan & Noor Hashima, 2016). While the employment of the moves and steps may not guarantee the citation counts, analysis indicated that the writers of the articles in the two groups did make different choices on the utilization of the moves and steps

The chosen publication year for the articles was 2010 because publications for that year already had stable citation counts and is still relatively new. Taking the most recent years such as 2014 or 2013 would not be possible as the database was still accumulating the data when this study was being conducted. Even though the database for publications for the year 2012 or 2011 already existed when this study was conducted, the citation index for these two years was still very small and not constant. The most suitable publication year was 2010 as the

database was already completed and the citation index had grown substantially and had become more constant in terms of citing hierarchy.

3.4.2.2 Citation Index

The Malaysian Universities Computer Science Scopus Articles include both research articles with high citation and research articles with low or no citation. The citation index is an important criterion for this study because of a few reasons. For one reason, citation index is systematically generated to indicate the number of times the paper has been cited by other writers. As such, it is more neutral and unprejudiced in determining the value of the research articles.

Moreover, citation index for publications is also one of the sought-after criteria for university ranking in Malaysia. As such, citation index has been taken into account in the performance evaluation of the academicians (Roosfa & Yahya, 2011; Singh, Thuraisingam, Nair & David, 2013). Given its importance, citation was also included as a criterion of selection for the corpus. By engaging both research articles with both high and low citations into the Malaysian Universities Computer Science Scopus Articles corpus, the moves and steps used in the research articles could be compared with respect to high and low citations.

For the analysis of the data, the citations of the research article were also considered. Research articles with six citations or more were grouped together in the Research articles with more citation group. Research articles with zero citation were grouped in the Research articles with lesser citation group.

Research articles with citation of one to five were not included in any group and were not counted in this analysis. The reason was to give the two groups the difference in citations which was needed to achieve the purpose of the analysis. It is noteworthy that the analysis was meant to obtain the description on the moves and steps being used in higher citation research articles as compared to lower citation research article. Therefore, if the citations of the two groups differed just by one citation, the moves and steps in the research articles could also possibly have similar descriptions. By eliminating research articles with citations of one to 5, there would be a difference of six citations between the groups. A bigger difference established between the two groups is needed to ensure that the two groups are really distinct and the research articles are not in either group by chance. The tabulation of the citation in each group is in Table 3.3.

Table 3.3

Citation group for the research articles

Citation group	**Description**	**Number of research articles**
Research articles with more citation groups	Citation 30 and above	6
	Citation 20 to 29	5
	Citation 10 to 19	31
	Citation 6 to 9	20
	Total	62
Research articles with lesser citation groups	Research article with zero citation.	65

Table 3.3 shows that research articles with more citation groups consist of 62 research articles while research articles with lesser citation groups have 65

research articles. For the analysis, the total moves and steps for each group was turned into percentages and comparisons were made in terms of the moves and steps accomplished.

3.4.2.3 Journal Wise Sampling

In this study, apart from including research articles from various other journals in the Scopus database, the Malaysian Universities Computer Science Scopus Articles 2010 corpus includes journal wise sampling as proposed by Shehzad (2008). In journal wise sampling, the research articles are taken from a selection of journals instead of random journals for the reason that research articles from the same journals showed more cohesive findings. Studies (Posteguillo, 1999; Shehzad, 2008) have shown that more regular patterns were detected in research articles from the same journal.

Two Malaysian journals, the Malaysian Journal of Computer Science and PERTANIKA Science and Technology, were chosen. All articles published in the journal for 2010 were included. The Malaysian Journal of Computer Sciences is published by the Faculty of Computer Science and Information Technology, University of Malaya. The journal has been in circulation since 1985 and is indexed in Scopus since 2007 and is also abstracted in ISI and a few other databases (MyCite, 2013).

The journal publications also include research articles from local and foreign universities, not limited to the academics only but also consisting the works from the business and industrial sectors in the field of Computer Science and Information Technology. Pertanika Journal of Science and Technology is

published by Universiti Putra Malaysia. The area for the research articles in this publication includes a wider scope than those in the Malaysian Journal of Computer Science. Apart from Computer Science and Information Technology, it also covers research in the area of bioinformatics, bioscience, biotechnology and bio-molecular sciences, chemistry, computer science, ecology, engineering, engineering design, environmental control and management, mathematics and statistics, medicine and health sciences, nanotechnology, physics, safety and emergency management, and related fields of study (MyCite, 2014). In this study, 14 articles were selected from the Malaysian Journal of Computer Sciences and 38 research articles were selected from Pertanika Journal of Science and Technology.

3.4.2.4 Types of University

Another selection criterion for the Malaysian Universities Computer Science Scopus Articles is the group of the university the articles are affiliated to such as the Accelerated Program of Excellence (APEX) university, the Research University, the Comprehensive University, the Focus University and the Private University. The group of the university is important because the group of the university determines the research role and the funding assigned, for example the Research universities are designated to produce a bigger number of researches and are allocated with more funds (Aizan, Rosna, Nurahimah, Chan & Doria, 2014).

The importance of research to this university group is evident even during the application stage to be in the Research University group where 80 percent of the

evaluation was on the quality and quantity of the research (Bakri and Willet, 2011). While the APEX university is given autonomy in finance, service scheme, management, student intake and a few other areas, the Private universities, on the other hand, are assigned with more operational roles such as expanding interest in and build research and development skills among the teaching staff and promoting collaboration between private and public universities (Lee & Fauzian, 2014). While all university groups place importance on quality research, the emphasis and competition is bigger in the higher groups. Such competition poses the question on whether the writers from these top university groups are employing more 'promotional strategies' (Shehzad, 2010) compared to those in the other groups.

Even when there are studies that describe the various roles and funding assigned to these university types (Maidin, 2010; Masron, Ahmad & Rahim, 2012), investigation on how having different roles on research held by these university groups affect research writing is still limited. For this reason, the university group is included as a criterion in the selection of the Malaysian Universities Computer Science Scopus Articles corpus.

3.4.2.5 Expert Identification

Given the significance of the disciplinary variation in this study, the Computer Science experts' views were needed to determine if the research articles were truly in the Computer Science discipline. The experts appointed were Professors and Associate Professors in the Computer Science Faculty with extensive teaching, supervisory, publication and research experience in the Computer

Science discipline. As such, identifying the discipline of the article titles was an executable task to them.

In the text selection process, the titles of the research articles were derived from the Scopus database using the search filters, but the multidisciplinary titles were still listed out. The keywords used for the filters were affiliation, year 2010, research article, and Computer Science area. Filter function was also used to exclude Multidisciplinary articles and other document types.

The order of appearance for the titles was according to the highest citation on top. Even though filter functions were used in the Scopus database, the titles of the articles derived from the filtering process still included the titles from the multidisciplinary research. Amongst the titles were Students' satisfaction using computer assisted learning and Customers' preference in the usage of internet banking. The titles were put in a list, along with the journal details, affiliation and writers' names. This information helps the Computer Science experts to determine if the article is in the Computer Science discipline. The full articles were also available should the experts need to look closer at the articles.

The experts marked Y for articles in the Computer Science discipline and N for articles that were multidisciplinary in nature. The articles that were labelled N were still included in this study to enable comparison on articles with experts' views. Comparing the Y and the N articles enable a more refined description of the moves and steps between the two groups. Some of the titles of the research

articles were inaccessible and had to be taken out from the list. An identification number for reference purposes was assigned to each article.

3.4.3 Description of the Corpus

The Malaysian Universities Computer Science Scopus Articles Corpus was created for this study and included 150 Computer Science research articles written by academicians in Malaysian universities. The size of the corpus was 606,279 words, excluding the reference sections. The macro-level analysis involved the entire corpus and the micro-level analysis were conducted on the Introduction sections which comprised 98,597 words. Table 3.4 gives the profile of the Malaysian Universities Computer Science Scopus Articles Corpus based on Bowker and Pearson (2002 in Shehzad, 2005).

Table 3.4

Profile of the corpus

Aspects	: 606,279 words
Size	: 150 research articles
Number of texts	: Computer Science
Text type	: Scopus indexed research articles
Authorship	: Written by academicians in Malaysian universities
Language	: English
Publication date	: 2010

The corpus was available both in the electronic and printed versions. Even though the records of the texts were registered using the manual process, having the electronic version made information retrieval faster.

The size of the corpus for this study was appropriate with the research objectives and framework of the study. While the corpus could be as large as 100 million

words as in The British National Corpus (BNC) and 1.7 million words as in the Michigan Corpus of Academic Spoken English (MICASE), the emphasis of the corpus as a useful resource to extract information was more related to the research objectives and analytical framework in analysing the corpus (Shehzad, 2005).

150 articles were chosen because the data gathered from the articles have reached saturation. Patton (2002) stated that sample size can be affected by "the purpose of the inquiry" which in this study refers to "identify patterns across data". This study wanted to know what the moves are and steps being used in the articles and how they moves and steps were realized. As suggested by Patton (2002), the articles were selected and added. Initially, the analysis of the articles indicated some patterns that lead to categories of how the moves and steps were realized. More articles were added until the analysis showed that new articles no longer generate new patterns and categories on how the moves and steps were realized. After analysing 120 articles, the patterns on how the moves and steps were realized became regular and predictable. For example in the analysis of Move 2 Step 1A, four categories were identified, after adding more articles up to 150,the categories became consistent and no new categories emerged because the patterns can just fit into the existing for categories. Similar consistency were noted in the categories for the other moves and steps upon reaching 150 articles. The data has reached saturation at 150 articles no pattern or category emerged

from addition of article and therefore the size of the corpus consists of 150 articles

Corpus sizes in similar studies have shown that the corpus size of this study was in the high average range. In his study Dudley-Evans used 156 research articles (1984, in Shehzad, 2005), Swales and Najjar (1987) used 110, Ahmad (1997) used 62, Kourilova (1998) used 80, Kanoksilapatham (2005) used 60, Atai and Falah (2005) used 80, Shehzad used (2005) 56 texts with 540,000 words, Habibi (2008) used 90 research articles and Escuardo and Swales (2011) used 84 research articles. Shehzad (2010) suggests that rather than looking at the sheer size, it is more important to have a balanced mixed group which has the potential to give results that are true indicators of the typical behaviour, and show central aspects of the language which can give enough samples of occurrences to establish reliable results.

Table 3.5 tabulates the number of research articles affiliated with the respective universities. The italicized fonts are details for the sampling from the Research university group. The calculation was done based on the total from each university group. All of the articles were analysed using the macro-and micro-analysis. However, many of the articles were co-written by authors from more than one university. To avoid confusion, the research articles were counted in only one of the university affiliations.

Table 3.5

Number of research articles by the university groups

University group	Number of research articles	Total counted	Interrater process
APEX	20	17	5
Research universities	94	77	17
Comprehensive	18	16	0
Focus	23	20	12
Private	21	20	15
Total	158	150	49

The "total counted" column refers to where the articles were counted for the analysis statistics. For example, the total of research articles from each research university was 94. However, because many of the articles overlapped in affiliation, the number of research article titles was only 77. The last column indicates the number of research articles that go through the interrater process (explained in section 3.4.2). 49 or 33% of the research articles went through the process.

3.5 Move Analysis

The move analysis was conducted to identify the moves and steps in the research article introductions. Identification of the moves and steps provided a description and understanding on what rhetorical strategies were used and how the strategies were achieved (Swales, 2004). This study adopted the revised CARS model (2004) for the micro-level analysis of the moves and steps.

There are a few reasons as to why this study used the CARS model version 2004, and the reasons mainly concerned the dynamic nature of the research

article (Swales, 2004; Shehzad, 2011) the problems pointed out by previous researchers in using the 1990 model (Swales 2004, Samraj, 2002) and the improvements made in the 2004 version by Swales himself (2004). The following paragraphs elaborate the points in detail.

The dynamic nature of the research article was pointed out by Shehzad (2011) particularly on "the increased trend in the "Promotional strategy" through the realization of Step 2 in Move 3 which is "Announcement of the principle finding". Shehzad (2010) showed the increase by plotting her new found percentage to the percentage gathered from previous studies (Swales and Najjar, 1987; Berkenkotter & Huckin, 1995). Because of this dynamic nature, the CARS version 2004 would be a better model compared to the 1990 version as the revised version would have captured the changes and trends that took place over the 14-year period.

One of the obvious problems with CARS version 1990 pointed out by previous researchers was in Step 3 Move 1 which is "Review items of previous research". Samraj (2002) reported that reviewing previous literature and incorporating citations to other work emerged throughout the Introduction section and not just restricted to Move 1 only, which is *Establishing a territory*. Following this and among others, Swales (2004, p. 227) revised the model and admitted that "literature review statements are no longer always separable elements..."

The improvement made in the 2004 model was highlighted by Swales himself (2004, p.230-231) who said "I therefore propose that these four realizations be

reduced to two, and also that the model take on board the potential cycling, or iteration". The reason to these changes was also because many researchers found the move "to be prevalent, especially in longer introductions." A few more modifications were made, as explained earlier, and the modifications were made as "the result of evolution in the genre itself or of further studies..." (p.230-231)

In addition, the Beiber Connor and Upton BCU Approach (Upton & Cohen, 2009) was used as a guide to put the model in motion for analysis. For the application of move analysis, this approach has 7 steps. The initial step requires identification of the functional categories or functional types of discourse unit (Lieungnapar & Todd, 2011) which this study derived from the CARS model (Swales, 2004). The model posits three rhetorical moves that can be realized using 10 variations of steps and possible recycling (Cortes, 2010, 2013). Out of the ten steps, four steps are optional and another three are identified as *probable in some fields, but unlikely in others*. This study looked at all the three moves, ten steps and observed the occurrence of possible recycling. The model served as the analytical framework and the moves and steps were used as the functional categories.

The adapted BCU approach (Upton & Cohen, 2006) put forward "Segmentation" as the next step and this step was done concurrently with step 3 which is "Classification". Analysis using the discourse units of the CARS moves and steps were applied to each phrase and sentence in the research article introductions using the hand-tagging method.

Interrater reliability check was performed at this stage to confirm the tagging of moves and steps, and any discrepancies should be resolved with affirmative recoding. Apart from that, additional moves and steps that were not prescribed in the CARS model should also be identified here. At this stage, the rhetorical moves that were made in the research articles could be identified.

After classifying all the texts according to the move type, the description of the organizational tendencies could be written by observing the obligatory and optional move realizations. It is important to note that a move is a realization of the communicative intents and not in units of structure of phrases. (Shehzad, 2010). Table 3.6 illustrates the move analysis conducted on Sample C5 IIUM4.

Table 3 6

Pilot move analysis for Sample 1

Text	**Move**
It is known that the theory of quantum dynamical systems provides a convenient mathematical description of irreversible dynamics of an open quantum system (see [2]) investigation of various properties of such dynamical systems have had a considerable growth. (Sic)	M1
In a quantum setting, the matter is more complicated than in the classical case. Some differences between classical and quantum situations are pointed out in [10].	M2S1A
This motivates an interest to study the dynamics of quantum systems (see [10]).	M2S2

M1 was realized in whole sentence whereas M2S1A was realized in two sentences. Even in two sentences, it was over the top to conclude that the writer has made two attempts for M2S1A. It is within reason to interpret the two sentences as one move rather than drawing the number of sentences as frequency of the attempt for moves. Therefore the Move analysis examines the

move occurrences rather than counting the frequency or order of the moves made in the research articles. For a start, five articles were studied and piloted. The finding of the pilot study is discussed in the last section of the chapter (3.8).

3.6 Reliability and Validity of the Study

As a measure of reliability and validity of the study, Creswell and Miller's (2010:125) suggestion on having a "third lens" is taken up to increase the "credibility of an account" of the study. "A third lens may be the credibility of an account by individuals external to the study. Reviewers not affiliated with the project may help establish validity as well as various readers for whom the account is written." In this study, Computer Science experts were appointed to enhance the output of two research processes. The processes involved were the selection of the research articles and the process of rating the moves and steps.

3.6.1 Expert, Views in Text Selection

Disciplinary variation has been reported as a significant factor in how writers write the research articles (Ngozi, 1997; Samraj, 2008; Shehzad, 2005; Sheldon, 2011). The Computer Science experts' views were needed to determine if the research articles were truly in the Computer Science discipline. The experts appointed were one Professor and one Associate Professor from the Computer Science faculty with extensive teaching, supervisory, publication and research experience in the Computer Science discipline. As such, identifying the discipline of the article titles was not a difficult task for them.

In the text selection process, the titles of the research articles were derived from the Scopus database using the search filters, but the multidisciplinary titles were still listed out. The keywords used for the filters were *affiliation, year 2010, research article,* and *Computer Science area*. Filter function was also used to exclude multidisciplinary articles and other document types. The order of appearance for the titles was according to the highest citation on the top. Highly cited papers were chosen because highly cited papers represent readership, impact and usefulness to the Computer Science area (Dong, Loh & Mondry, 2005; Hirsch, 2005). Besides that, the titles with no citation were huge in number and this in turn, complicated the criteria of selection. Even though the filter functions were used in the Scopus database, the titles of the articles derived from the filtering process still included titles from multidisciplinary research. Amongst the titles were "Students' satisfaction using computer assisted learning and Customers preference in the usage of internet banking". The titles were put in a list, along with journal details, affiliation and writers' names. This information helped the Computer Science experts to determine if the articles were in the Computer Science discipline. Full articles were also available should the experts needed to look closely at the articles. The experts marked Y for articles in the Computer Science discipline and N for articles of multidisciplinary in nature. The articles that were labeled N were still included in this study to enable comparison with articles with experts' views. Comparing the Y and N articles enabled a more refined description of the moves and steps between the two groups. Some of the article titles were inaccessible and had to

be taken out from the list. An identification number for reference purpose was assigned to each article.

3.6.2 Interrater for Move Analysis

Interrater reliability check was done on both the micro- and macro-level analysis. The interrater reliability was done to confirm the understanding of the analysis; whether the moves are realized in the research articles and to identify how the moves and steps are accomplished in the research articles. As advised in the BCU approach (Upton and Cohen, 2009) the coding protocol needed to be revised and the problematic area had to be studied at this stage. Following the checking, the discrepancies between the researcher and the interrater were resolved by negotiation and this gave the final code for the steps and moves.

The interrater process started with selecting an interrater. The selection criteria for the interrater were set as being competent in understanding the computer science research articles and being experienced in citing and writing research articles. Having knowledge and the experience in using and producing Computer Science research articles would ensure that the interrater understood the subject matter well and was ready to undertake the role as an analyst using the moves and steps. A master's student with a Computer Science degree was selected, trained and made to analyze 5 articles before being assigned with the task as the second coder. The interrater process is described in Figure 3.2.

Figure 3.2 shows the process that the interrater was taught about the moves and steps. Five research article introductions were used to coach the interrater on

how to perform the move analysis. During this coaching, the interrater understood how the moves and steps could be recognized and identified. Coding identification was first practiced by the interrater as training for better accuracy in identifying the moves in the data (Sheldon, 2011). And then, the interrater performed the move analysis autonomously by employing the course of action as trained earlier.

In this study, the interrater reliability process was conducted on 37% of the total number of research article introductions. The main reason was because the coding was not fully developed and was expected to evolve with some of the grounded moves and steps.

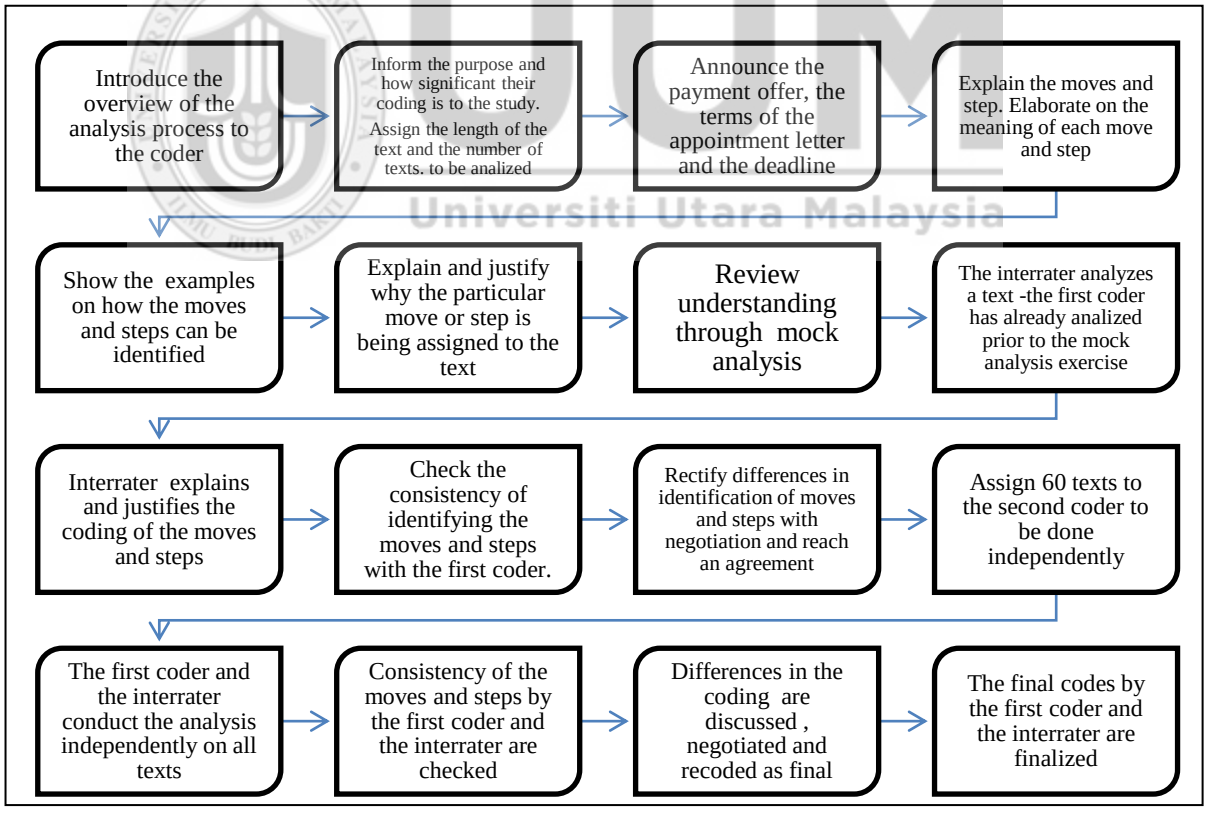

Figure 3.2 Interrater process

While a fully crossed interrater process is desirable (Lee, Kantor and Mollaun, 2002 in Meadows & Billington, 2005), it is rarely feasible for large scale situations (Meadows & Billington, 2005). During the interrater process, the coding assigned for the interrater was top-down and fixed according to the model. The codes derived from the model could be incomplete and more themes were expected to be grounded in the following process. While more moves and steps needed to be grounded, identifying and grounding the new moves and steps was not the purpose of having the interrater process. The interrater's role was as a content expert, hence evolution should not take place during the interrater process. Moreover, the main purpose of having the interrater process was to obtain an expert's view in terms of interpreting the scientific content (Kanoksilapatham, 2007). The expert's view on the scientific content was needed as to give the "third lens" to increase the "credibility of an account" as suggested by Creswell and Miller (2010:125).

The percentage of similarity between the first rater and the interrater was 85%. The discrepancies between the two rates were reanalyzed and negotiated. A discussion was conducted on the functional categories so that the affirmation by both raters could be achieved on the disagreements (Landis & Koch, 1977, in Lim, 2010; Gwet, 2010). Following Sheldon (2011), the remaining differences were resolved through discussion and clarification and finally the similarity rate was at 96%.

3.7 Linguistic Feature Analysis

The linguistic feature in focus is the transitional words for Move 1 and Move 2.The analysis on the transitional words is added to identify the transitional words that have been used in realizing Move 1 and Move 2. The identification of the transitional words describes how the accomplished writers have realized the rhetorical strategies suggested in CARS (Swales, 2004). Such description can be used by language instructors which may be difficult to find authentic examples for teaching purposes. The transitional words illustrate the various ways that can be used to accomplish the Moves. It is done to gain an understanding on the most commonly used transitional words in Move 1 and Move and to understand the difference transitional words used in the different moves and steps. It is hoped that the description on the transitional words would give an understanding on pedagogical application. The following paragraphs have been added.

Correct usage of transitional words is one of the substance for good writing (Fang, 1996).Besides, the use of transitional words has been reported to support coherence and to establish sequence within and between paragraphs (Gardner, 2003). Appropriate use of transitional words has been notified to contribute to the writing discourse cohesion and coherence. Besides, students and teachers also have reported that their writing skills have improved with more transitional words introduced (Kathpalia & Heah, 2008). Furthermore, language teachers should be provided with a list of commonly used transitional words as to improve the clarity in the writings of English Second Language users (Cameron,

2007). Due to the importance and salient function of transitional words in writing, transitional words have been used as an indicator for linguistic accuracy in writing rubrics (Kobayashi & Rinnert, 1992; Polio, 1997). Following the valuable functions of transitional words in supporting clarity and coherence in writing, this study investigates the high- frequent transitional words used in the corpus by focusing to 1) Identify the transitional words commonly used in Move 1 and Move 2. 2) Describe how the transitional words highlight the sentence to be distinguished as a particular move or step. 3) Indicate the purpose of the transitional words in the particular move or step.

The analysis of the transitional words is conducted by counting the frequency of the transitional words appeared in Move 1 and Move 2. The text are read and the transitional words is marked. Each of the transitional word is recorded in a list. The list records the transitional word according to the occurrence in Move 1, Move 2 Step 1A, Move 2 Step 1B and Move 2 Step 2.The occurrence of the transitional words are then noted in the list and added for the frequency count. The frequency counts for each move and step are compared and the order of occurrence for each Move and Step is obtained. And then, the most occurring transitional words for each move and step are studied for differences and similarities in the usage. The frequency and the usage of the most occurring transitional words are reported in Chapter 4. (see 4. 3.1 Transitional words in Move 1 and 4.3.2 Transitional words in Move 2)

3.8 Interviews

The purpose of the interview is to recount the reasons and explanation on the practices made by the selected writers without generalizing to all the writers. The purpose of the interview was to find out why some of the writers write the way they do whereby each of the writer gave their reasons and explanation on their practices. The interviews were conducted with four writers only because each of the interviewees has given the understanding of the phenomenon studied through each perspective. For qualitative study, Patton (2002, p.101) had it that the sample size for the interview depends on "what you want to know" and "amount of useful information obtained from each participant". The outcome of the interview is not meant to be generalized to the entire writers' population. The interview is to tell the researcher the moves and steps the selected writers have been practicing and the reason to their choices. While the aim is not to make any generalization, the data collected is meant to recount the reasons and explanation on the practices made by the selected writers. Patton (2002, 100) suggested that Purposeful sampling can be used as a strategy to learn and understand about a "selected cases without needing to generalize to all cases". Patton justified that instead of studying some representative samples, one can learn most by studying and understanding the unusual cases. He asserts that more can be learned from studying classified cases than trying to determine what the average case is like. Moreover, the limited resources faced by this study makes is not possible to get detailed information from a large number of

interviewees to make generalization. Because of the small number of interviews, this study does not permit generalization in any rigorous sense.

While the strategy of the sampling is represented in categories of discipline and expertise level, the strategy is not attempting to generalize findings to all writers in the category. The focus of the interview is to understand what is happening, particularly on why the writers employ the strategies of their choices the way that do. Interviews were conducted with four writers only because each of the interviewee had exhibited an understanding of the phenomenon studied through each perspective. For a qualitative study, Patton (2002) had it that the sample size for the interview depended on "what you want to know" and "amount of useful information obtained from each participant".

The interviewees consisted of a beginner writer, an experienced writer, a Computer Science writer and a Computer Science sub-discipline writer as illustrated in Table 3.7 Four interviews with of this group was sufficient as Braun and Clarke (2013) also suggested that pattern-based discourse analysis which gives accounts of practice participation can have one to six interviews. The interview was conducted not to show the differences but to understand the phenomenon through the perspectives of the writers.

Table 3.7

Sampling of Interviewee

	Computer Science	Sub-computer Science
Beginner writer	Interviewee 1	Interviewee 2
Experienced writer	Interviewee 3	Interviewee 4

Creswell and Miller (2010) recommended the use of "a second lens" on the justification that "qualitative paradigm assumes that reality is socially constructed and it is what participants perceive it to be". Interviews are more flexible compared to data collection using questionnaires as probes can be applied when necessary (Sullivan, 2001). While both interviews and questionnaires have structured questions, the interview has the conversational style which is important to initiate respondents to give more accurate and complete information. Compared to the survey, the conversational manner provides the opportunity to the interviewer to encourage better responses especially when the information is complex. Apart from that, the interview also gives a chance for the questions to be explained and clarified. Given that the questions do have specific terms derived from the CARS model which may be unfamiliar to the respondents, the interview provides the opportunity for clarification and explanation of the terms.

Another reason is because the respondents are non-native English speakers and they may prefer to express their answers in a language register that they are comfortable with. Having the respondents to write the answers would divert their attention to the writing mechanics, hence the real information needed may be side-tracked. Finally, the interview gives the interviewee control over factors that cannot be controlled in surveys such as the order of questions and requesting elaboration.

However Sullivan (2001) has also warned of the limitation of this method in the possibility of having interview bias. Interview bias can happen as the interview

may be misinterpreted (Sullivan, 2001: 272). To minimize such bias, the interview is transcribed per verbatim. Only after cross-checking three times to ensure that the transcription was a verbatim reported the recorded version, then only the summary and analysis were made. Sullivan (2001) also warned that a phone interview limits the visual contact with the interviewee, depriving the data of facial expression and body language. However, for the study, facial expression and body language were not as crucial as in psychological studies as the data needed were on the justification of the choice of rhetorical strategy.

3.8.1 Interviewees

The interviewees consist of beginner writer, experienced writer, Computer Science writer and Computer Science sub discipline writer as illustrated in Table 3.8. Four interviews on this group is sufficient as Braun and Clarke (2013) also suggested that pattern based discourse analysis which gives accounts of practice participation can have one to six interviews. The interview was conducted not to show the differences but to gain the understanding on the phenomenon through the perspectives of the writers.

The purposive sampling procedure was used to determine the interviewees. As Sullivan (2001,p.209) highlighted, purposive sampling "involves selecting elements for the sample that the researcher's judgement and prior knowledge suggests will best serve the purposes of the study and provide the best information". The findings of the move analysis laid out the elements for the

interviewees; as such, purposive sampling was used. In this case, the analysis of the text indicated the elements that were needed for the interview sampling.

From the move analysis, frequently cited writers write differently from the writers that have never been cited and computer science writers adhere to certain rhetorical structures which are different from the Computer Science sub-discipline writers. So, the sampling for the interview had to consist of a beginner writer, an experienced writer, a Computer Science writer and a Computer Science sub-discipline writer. The elements of purposive sampling in relation to the interviewees are illustrated in Table 3.8.

Table 3.8

Purposive sampling of Interviewees

	Computer Science	Sub Computer Science
Beginner writer	Interviewee 1(K)	Interviewee 2 (S)
Experience writer	Interviewee 3 (N)	Interviewee 4 (A)

In this interview, four interviewees were chosen using purposive sampling. The respondents were a beginner writer (Interviewee 1), an experienced writer (Interviewee 3 and Interviewee 4), a Computer Science writer (Interviewee 3) and a Computer Science sub-discipline writer (Interviewee 2 and Interviewee 4). Interviewee 1 was a beginner in writing research articles who had not published any printed research articles in journals and was completing her Masters in Science study in the area of Computer Science. Interviewee 2 was doing her PhD in a sub-discipline of computer science and the research articles that she wrote were in the area of an expert system for dentistry application. Interviewee 3 had obtained her PhD in Computer Science a few years ago and had written

several indexed papers. Interviewee 4 had obtained his PhD and had written 2 impact factor research articles.

3.8.2 Interview Questions

Apart from choosing suitable interviewees, Sullivan (2001, p. 207) also suggested that "good directions are needed to ensure that all information is collected and done quickly". Accordingly, the questions were constructed using the findings of the move analysis as guidance. The questions were divided into two parts; the demographic part and the writing experience part. Nine semi-structured questions were used as they were more focused and could anchor the answer to the issue being investigated. Table 3.9 lists the questions asked during the interview.

The interview was done by the researcher over the phone as in "non-schedule – standard interview" (Sullivan, 2001, p.265). In this procedure, the questions were structured with predetermined topics and specific questions were asked to all respondents. While being structured, the interview session "remains fairly conversational" as questions were rephrased and the order of sequence were less fixed. The interviewee also interjected new probe questions at certain points. As the questions were open-ended, the interviewees had "a full freedom of expression" on the topic. The probes were in the form of follow-up questions, pauses and explicit request to clarify or elaborate some points which were deliberated "to elicit clearer and more complete response" and to encourage the respondents to elaborate. (Sullivan, 2001, p.268).

Table 3.9

Interview questions

	Questions	Justification
1	When writing your research article INTRODUCTION, do you cite other researchers? Why or why not?	Move analysis showed that citation has been delayed to the later sections hence the reason for this is being investigated.
2	When writing your research article INTRODUCTION, do you justify why your research is important? Why or why not?	Move analysis for move 2 showed that Step 2 "presenting positive justification" was the least preferred step amongst the other move 2 steps and the reason is being investigated.
3	When writing your research article INTRODUCTION, do you present your research questions? Why or why not?	This is the least preferred move amongst all and the writer's perspective is needed for deeper understanding.
4	Do you provide definitional clarifications for the unusual terms used in your article in the INTRODUCTION section? Why or why not?	Computer science uses many special terms and yet only 17 percent of the articles used this step; so the reason is being investigated
5	Do you summarize your methods in the research article INTRODUCTIONS? Please explain why or why not.	This is an optional move with the highest utilization so the motivation on using this step needs to be examined
6	Do you announce your principal findings in your research article INTRODUCTION? Please explain why or why not?	This step is not obligatory in the corpus despite the findings that it is an obligatory move for the research article in the Computer science discipline; so the reason for this lack of use is being investigated.
7	Do you promote the value of your research in the INTRODUCTION section of your research article? Why or why not?	The writers of research articles in this corpus did not utilize this step as much as the global writers; therefore, the reason is being investigated.
8	Do you outline the structure of your paper in the INTODUCTION section of your research article? Why or why not?	Most of the writers of the research articles in the corpus took this move and the reason is being investigated.
9	What are the problems that you usually faced in writing your research article introductions?	This question is to further find out the other problems in writing the research article introduction.

The interview session was audio recorded. Audio recording was chosen because of its simplicity as the recorder was small and easy to use. Ethically, the use of the audio recorder was taken as being consented by the interviewees upon their agreement to be interviewed. The interview was transcribed verbatim. It was necessary to transcribe verbatim to avoid the bias effect in analysing the responses.

3.9 Ethical issues

This study has taken a few measures to ensure that the research procedures are within the ethical guidelines such as measures on confidentiality and anonymity. The anonymity of the articles were protected by assigning a code to each of the articles. The use of the codes kept the name of the authors and the title of the research article as restricted information, disclosed only to those involved directly in the study such as the interrater and the computer science experts. The authors of the articles cannot be identified directly to the text in the corpus. The research articles were also assigned with code which did not disclose the name of the writers. The research articles were taken from open database which was indicated a reference and as open documents. Creswell (2007, p.162) cautioned that a researcher must "protects the anonymity of the informant, for example by assigning number or aliases to individuals". Following this, the interviewees were given aliases as to avoid the interviewees from being identified.

Apart from anonymity, the guideline on consent by Creswell (2007) was also considered. Creswell (2007) had it that to gain support from the interviewees,

the interviewees must be informed that they are participating in a study, the purpose of the study must be explained. In this study, from the beginning, the interviewees were informed about the call for participation and the purpose of the study. They were also informed on the nature of the study as being academic and that the report would be in written and publishable. Before clarifying on these matters the initial information was sent in an email which can be easily declined by the receiver should they want to.

Patton (2002) has cautioned on the issue of confidentiality which may be complicated. While the anonymity guideline avoids the authors and articles from being recognized specifically in the report, it may be still possible to identify the authors and the articles from the quotations in the written report and publication. This is particularly true when Computer Science is still a growing discipline in Malaysia where academicians may be familiar with the works of others in their field. But because the purpose of this study is within the line of improving pedagogic tool, it is necessary for the quotations to be included openly in the report. Under this circumstances, while the quotation is being reported in the reports, the actual names of the authors and the titles of the research articles are not disclosed.

3.10 Pilot Study

The text analysis in this study used constructs from the and moves and steps as in the CARS model (Swales, 2004). The BCU approach, which was designed for corpus-based move analysis (Upton & Cohen, 2006), was used in the analysis

application. The first step in the BCU Approach (Upton & Cohen, 2006), which is the Functional categories includes "conducting a pilot-coding to test and fine-tune definitions of move purposes". Following the suggestion, this study conducted a pilot test on the 5 Computer Science research articles written by academicians in a Malaysian university. The objectives of the pilot study were to find out if the moves and steps in the CARS model were suitable for the move analysis. The pilot study was employed on 5 research articles. PS1 and PS2 were the articles that were not indexed in the Scopus database but the rest were indexed in the Scopus database.

The pilot analysis was done on 2 non-Scopus articles and 3 Scopus articles. In this pilot analysis, the CARS model was used for top-down analysis. Then, the structures that deviated from the model were identified and analyzed bottom-up for a theme. Even though the theme could not be confirmed because of the small sample number, the structures identified showed a consistency that might lead to a potential theme.

The analysis of the pilot sample 1 could explain how the move analysis was carried out. For a start, the text was read and the cue words and structures as described by Ahmad (1997) were looked for. Upon identifying the moves and steps, labels were written on the sides as M1S1, M1S2, M1S3 and so on.

For a start, the research article identified as the sample for the pilot analysis was downloaded and printed. Due to the small number of pilot samples, the analysis was done on printed papers. The analysis notes were labelled on the sides and

the linguistic descriptors were highlighted. Table 3.10 shows the pilot analysis study on sample one. All of the sentences in the text conformed to the standard move in CARS and did not have any structure that did not match.

Table 3.10

Pilot analysis study on Sample 1

Text Pilot ID 1	Move/ Step	Remark
1. Introduction		
With an increasing human population, a smooth traffic flow is necessary to ensure safety. There is continuous research on modeling complex behavior phenomena in traffic flows and occupant evacuation, and numerous researchers have applied their knowledge and skills to pedestrian [1], [2] and diversity behavior studies, in [3], [4] such as jam formation, flocking, and lane-formation [5], [6], [7], [8], [9], [10], [l1]. To study these complex dynamical systems, several models have been proposed, including those of lattice gas [7], l9l, [4], [5], [16] and cellular automata (CA) [5], [1], [1 3], U4} ll7l, [18], [1 9].	M1 M1 M1	M1- Establishing a territory- (Citation required) via Topic generalizations of increasing specificity
Particularly interesting are the CA models, since they can model both the individual and collective behavior of pedestrian dynamics observed experimentally (described by other complex models [5],[I l], [13], [18], [19]).	M2	M2- Establishing a niche (Citations possible)

The CA are discrete dynamic systems dealing with evacuation situations in their capacity to develop complex behaviors from simple computation and rules.	Recycling	Possible recycling of increasingly specific topics
These rules allow specifying the new state of a cell, and the possibility of modeling complex dynamic systems from the specification of its components. An extra advantage is the detail provided by displaying the results graphically, allowing for an easier study of the dynamics of these systems. One particularly interesting problem is the motion in a room with elderly occupants	M21A	M21A Establishing a niche (Citations possible) via Indicating a gap
In Section 1, we investigate the pedestrian dynamics of elderly occupant evacuation in emergencies, we use CA as the basis of our simulation model, and concentrate on those cases involving the forced evacuation of a number of adults and the elderly, within a building with a specific number of exits.	M3 M3S1	MS3S1- Presenting present work (Citation possible) via (obligatory) Announcing present research descriptively and/or purposively
In Section 2, we describe the set of rules governing the movement of pedestrians in the model. Detailed methodology using the fuzzy-logic controller in CA is explained in Section 3.	M3S7 M3S4	M3S7- Presenting present work (Citation possible) via
Section 4 describes how the elderly velocity algorithm is incorporated into the system.	M3S7 M3S4	(PISF) Outlining the structure of the paper
In Section 5, we describe our experimental work with different versions of this problem, and report the performance analysis of each case.	M1S7 M1S4	M1S4- Presenting present work (Citation possible) via
Finally, in Section 6, we summarize the results and point out possible future extensions.	M1S7 M1S4	(optional)Summarizing methods

Move Structure- M1-M2-R-M21A-M21A- M3- M3S1- M3S7- M3S4- M3S7-M3S4-M3S7-M3S4-M3S7-M3S4

The data gathered from the move analysis for the pilot samples are tabulated in Table 3.11. Some interesting findings were noted in the move-step analysis of the articles written by Malaysian academicians. All of the articles conformed to Swales's first move-step which is *Establishing territory: Claiming centrality*. All the articles also conformed with M1S2 which is *making topic generalization.* No additional structure was identified from the sample of Non-Scopus articles which were Article 1 and Article 2.

Some of the missing rhetorical moves were M2S1B *Adding to what is known.* While most writers summarized what is known, the writers did not point out what was lacking in the previous studies nor made any criticism and did not state how the current study would add to the existing knowledge. The writers also avoided the strategy in M2S2 *Presenting positive justification*, that is, to give reason as to why the study was conducted.

Table 3.11

Pilot analysis using CARS model (Swales, 2004)

ID	M1	M2	M2SA	M2S1B	Rcyc	M2S2	M3	M3S1	M3S2	M3S3	M3S4	M3S5	M3S6	M3S7
1	*	*	*		*		*	*			*			*
2	*	*	*		*		*	*			*			*
3	*	*	*		*		*	*		*	*			
4	*	*	*		*		*	*						*

5	*	*	*		*		*	*				*	*	

While the writers indicated a gap, the writers did not present how the study would fill the gap. None of the studies presented the research questions or hypotheses. Only one out of five announced the principle outcomes and stated the value of the present research. This is contradictory to Shehzad's (2010) study that highlighted the announcement of the principle finding (APF) as an increasing trend in computer science research articles.

In the pilot study, 2 non-Scopus and 3 Scopus articles were analysed. The analysis on the two categories indicated some differences that lead the study to focus on Scopus research articles only. The first difference was in the general structure whereby the non-Scopus articles had more varied structures compared to the Scopus articles which had more consistent structures. The diverse structures in non-Scopus articles are evident in the range of sections used such as Materials, Methodology, Equation and Theory whereas the Scopus articles put such issues in a discussion under one standard section identified as Material and Methods. The reason for this could be related to the research content whereby the non-Scopus articles were more focused on the literature development and design of the research whereas the Scopus paper were more interested in discussing the niche of the research particularly on the finding of the research. Following this, the non-Scopus articles had longer write ups on the development and design of the study such as having extensive reference and reviews on the development of the theory, explaining the development and formulation of the equation used and describing the setup of the materials and

instruments. The Scopus articles also discuss on these matters but the explanations were done with more economy of words, with precisions using terms that requires less lengthy explanation, with relevant citations and with less discussion on the development of the theory. Given that this study is to contribute in the interpretation of rhetorical model for pedagogical use, the difference in the general structures between the two groups suggested that the Scopus research articles is more suitable to be used as the corpus of this study.

Apart from the general structure, the micro analysis also found that the non-Scopus articles had many major problems other than rhetorical strategy whereas the Scopus articles had less problems thus support rhetorical strategy to be the focus of this study. The non-Scopus articles were found to contain many problems related to grammar, writing mechanics, citation and references, content and research depth which require more than rhetorical models as the solution. The variety of problems lead to indefinable focus consequently affects the articles suitability as samples for teaching and learning. Moreover, apart from the diversity of problems, each articles also had different problems. On the other hand, the Scopus articles had more consistent problems and for that reason are potentially able to generate a more accurate description of the genre and thus assist interpretation of the model as a pedagogical tool

In short, the analysis on the two categories indicated some differences that lead the study to focus on Scopus research articles only. The non-Scopus articles in the pilot study contain more error and deviancies which may be suitable for investigation on writing problems and error analysis. Such investigation is not

the focus of this study. Then again, the Scopus research articles have less variety of problems which make focus on rhetorical strategy possible. Besides, Scopus articles also have richer resource of data to supply exemplary quotations and techniques for classroom application which is more relevant in the interpretation of the model as a pedagogical tool.

CHAPTER FOUR

FINDINGS

4.1 Introduction

In this chapter, the findings of the study are presented in two sections, the macro level analysis, the micro level analysis which describes the findings from the move analysis and the interviews. The reasons to find the data are to answer the following research questions:

RQ 1. What are the moves and steps typically found in the research article introduction in computer science discipline that are written by academicians in Malaysian universities?

RQ 2. To what extent do the academicians in Malaysian universities conform to CARS model (Swales, 2004) in writing Computer Science research article introductions?

The move analysis was done on the research article introduction sections of all 150 articles which consist of 98,597 words using the CARS model (Swales, 2004). The reason for these analyses was to obtain the description and understanding on the way the structures are achieved in Computer Science research articles written by the academicians in the Malaysian universities. Identification of the moves and steps provide description and understanding on what rhetorical strategies were used and how the strategies were achieved (Swales, 2004).

The interview was conducted with four interviewees to identify the writing problems in writing publishing Computer Science research articles faced by the academicians in Malaysian universities. The following sections describe the findings of the study at macro level analysis, micro level analysis and the interview.

4.2 Findings of the Move Analysis

The analysis of the data has been presented according to the moves structure proposed in CARS (Swales, 2004). The frequency of each moves and steps are presented. The summary of the moves and steps are compared with the Computer Science rhetorical structure proposed by Shehzad (2010b) are added and presented in the beginning of Chapter 4 in the following table.

The findings of the move analysis are summarized and presented in the following table. The findings from the previous study on Computer Science research article introduction by Shehzad (2012) is also listed as comparison. Table 4.1 shows the comparison on the move and steps for Computer Sciences research article introductions. The patterns identified indicated the common and underutilized moves and steps which bring forth some pedagogical considerations.

Table 4.1 shows that 94% of the article introduction sections in the study utilized Move 1 at an obligatory level, which is close to the 95% occurrences in the study by Shehzad (2012). Similarly, Move 2 “Establishing a niche” has also

However, Move2 Step 1A has been underutilized in only 73% of the article introductions as compared to 95% occurrences in the study by Shehzad (2012) and 91.7% in the study by Anthony (1999).

Table 4.1

Comparison on the moves and steps

	This study	Shehzad(2012)
Move 1		
Establishing a territory	94%- Obligatory	95% Obligatory
Topic generalizations of increasing specificity		
Move 2		
Establishing a Niche (Citations possible)	100%- Obligatory	93% Obligatory
Step 1A Indicating a gap	73% Optional (Underutilised)	95% Obligatory
Step IB Adding to what is known	99%Obligatory	NA
Step 2 Presenting positive justifications (optional)	62%Optional	NA
Move 3		
Presenting the present work	91% Obligatory	NA
Step 1 (Obligatory) Announcing present research descriptively and/or purposively	86% Optional(Underutilised)	98% Obligatory
Step 2 (Optional) Presenting RQ or hypothesis	1% Optional	32% Optional
Step 3 (Optional) Definitional clarifications	17% Optional	NA
Step 4 (Optional) Summarizing methods	53% Optional	NA
Step 5 (PISF) Announcing principle outcomes	15% Optional(Underutilised)	73% Obligatory
Step 6 (PISF) Stating the value of the present research	35% Optional(Underutilised)	55% Obligatory
Step 7 (PISF) Outlining the structure of the paper	34% Optional(Underutilised)	86% Obligatory

The writers in this corpus have underutilized the strategy of Move 2 Step 1A which is "Indicating a gap". Such low percentage is to be addressed as Shehzad (2012) has reported that this step is used at an obligatory level by the Computer Science writers in her corpus. Alternatively, the writers in this study have utilized Move 2 by using Step 1B "Adding to what is known" which has been fulfilled in 99% of the corpus. Even though, this step is not available in the previous CARS model (Swales, 1990) used by Shehzad (2012) thus not

available for comparison, the percentage of 99% showed that Move 2 Step1B is the most preferred step to realize Move 2.

Move 2 Step 2 "Presenting positive justifications" is also not reported by Shehzad (2012) and only occurred in 62% of the corpus. In short, comparing the percentages of the three steps for Move 2 "Establishing a niche", it can be concluded that most of the writers prefer to add "to what is known" compared to Indicating a gap" and "presenting positive justifications". Least attempt was made using Step 1B "presenting positive justification" with only 62% occurrences nevertheless; the occurrences which are at optional level, concurrence with the suggestion in the CARS model (Swales, 2004). In correspond to the findings on Move 1 and 2, it is suggested that more emphasis and caution on utilizing Move 2 Step 1A "Indicating a gap" is given in the teaching of writing using CARS model (2004) to Computer Science writers in Malaysia.

Move 3 is deemed as an obligatory Move with 91% occurrences. While the percentage for Move 3 is high, the percentages of the steps used to realize this move indicate that some of the steps are underutilized. Step 1 for Move 3 "Announcing present research descriptively and/or purposively" has been underutilized at only 86% compared to 98% in Shehzad (2012). In addition to the lower percentage, the corpus utilized Move 3 Step 1 A as an optional step as such diverted from the CARS model (Swales, 2004) which has the step as an obligatory. Move 3 Step 2 has also been utilized in a smaller percentage compared to the study by Shehzad (2012). Only 1% of the corpus opts for this

step compared to 32% in Shehzad (2012). Despite having a small percentage, the low preference in using this step it is not problematic because this step is also suggested as an optional step in CARS model (Swales, 2004). Move 3 Step 3 "Definitional clarifications" and Move 3 Step 4 "Summarizing methods" are realized at 17% and 53% respectively. The utilization of both steps are at an optional level as such corresponds with CARS model (Swales, 2004). However, percentages from the previous studies on Computer Science articles are not available for comparison because these steps are newly added in CARS 2004 model (Swales 2004) whereas most of the studies used CARS 1990 model (Swales, 2004).

The steps in Move 3 are less fixed in orders and may appear before one or another. Swales (20040 suggested that Step 5, Step 6 and Step 7 are possible in some field but may also be unlikely in others. In this study, Move 3 Step 5 "Announcing principle outcomes" is realized in only 15% of the corpus. The percentage of 15% is alarmingly low as the utilization of this step in similar studies suggested that this step is realized at higher percentage of 73% in Shehzad (2012), 70% in Posteguillo (1999) and 75% in Anthony (1999). Furthermore, Shehzad (2012) suggested that this step is an obligatory strategy for Computer Science articles. Move 3 Step 6 "Stating the value of the present research" is also underutilized at 35% compared to 55% by Shehzad (2012). This step is recommended as an obligatory step in Computer Science research article; however the corpus of this study has the step as an optional strategy. In addition to the low percentages in Step 5 and Step 6, Move 3 Step 7 "Outlining

the structure of the paper" is also realized at a low percentage of 34% compared to the other studies with 86% (Shehzad, 2012), 70% (Posteguillo, 1999)and 83.3% (Anthony, 1999). Following the low utilization when compared to the other Computer Science corpus, Move 3 Step 5, Step 6 and Step 7 must be emphasized in the writing classroom for Computer Science writers in Malaysia.

In short, the patterns of the findings indicate the common Moves and Steps that are being utilized by the Malaysian writers. The underutilized Steps have also been identified and thus suggested the need for more emphasis and caution in the application of CARS model in teaching writing for this group. While the findings indicated the applicability of CARS model (Swales 2004), the description on how the moves and steps are utilized in target publication is still needed; particularly when many English teachers are not content experts in Computer Science discipline.

The following table elaborates on the patterns of how the Moves and Steps have been utilized in the corpus. The realizations of the Moves and Steps suggested a few patterns that bring forth a few techniques.

The identification of a move is governed by the definition that a move can be a single unit or phrase, a whole sentence or even a paragraph (Swales, 2004; Jogthong,2002). Shehzad (2012) defines moves as discourse units that convey communicative intent rather than units of clause, sentences or lexico-gamantical criteria. Thus, the identification on the presence of a move is not a definite

sentence or word per say, but rather on the realization of the move in a particular context.

A conventional move must occur in 60% of the corpus; if "below 60% than the move is considered optional" (Kanoksilapatham, 2005:272). And this was reinstated again "a move is considered obligatory if its frequency exceeds 60% of the corpus...if a move occurs less than 60% of the corpus, the move is optional" (Kanoksilapatham, 2007:177). However, other recent researchers sets that only at 90% of the move realization in the corpus is "deemed to be classified as obligatory" (Sheldon 2011:241 and Soler-Monreal, Carbonell-Olivares and Gil-Salom, 2011)

Table 4.2

Scale for the practice and move occurrence.

Occurrences of Moves	Practice
100 to 90%	Obligatory
Below 90%	Optional

This study uses the occurrence scale by Sheldon (2011:241) and Soler-Monreal, Carbonell-Olivares and Gil-Salom (2011) view for the reasons that research articles are dynamic in nature and changes accordingly over the years according to the needs of the discourse communities (Swales, 20014). It has been more than 10 years since the study by Kanoksilapatham (2005) and taking heed from the warning by Swales (2004) on the dynamic nature of research article writing, the most recent view is necessary. Therefore, this study uses the occurrence scale in the more recent studies and the scale is as in Table 4.3.

In the following sections, I will illustrate the moves and steps in the research article introductions. Move 1 is described in 4.2.1, Move 2 in 4.2.2 and Move 3 in 4.2.3.

4.2.1 Move 1: Establishing a territory

In this section, the explanation of Move 1: Establishing a territory is given and then, the percentage of occurrence according to university groups, journal type, citation rate and subdisciplines are presented. This is followed by the findings from the interview regarding this move are presented. Finally this section describes three identified techniques that have been used to realize Move 1: Establishing a territory in the corpus.

Move 1 has been deployed mostly at the beginning of the Introduction section. These are some of the excerpts (F2UTHM, F12UniMAP1MJCS9) to illustrate the utilization of Move 1. In both excerpts (F2UTHM, F12UniMAP1MJCS9), Move 1 has been realized as proposed in CARS (2004) model where the first sentences establish the topic of the research at general level. The second sentence poses more specificity to the topic of the research and the third sentence link the general topic of the research to the existing body of knowledge in preparation for further specificity that leads to the niche of the research. 114 research articles or 94 % of the research articles in this study fulfilled this move.

Table 4.3

Excerpts on Move 1

Lines	Excerpts	Move
1 2 3 4 5	Image and signal processing is (sic) one of the emerging areas and their state-of-the-art have (sic) changed the way its computationally complex algorithms and systems are implemented.	Move 1 Establishing a territory
6 7 8 9 10 11	Increasing demand for real-time processing as well as maintaining the system performance is of crucial importance and motivates a strong justification to further research in these areas.	Topic generalization with increasing specificity
12 13 14 15 16 17	Reconfigurable hardware, especially field programmable gate arrays (FPGAs)are widely used in image and signal processing applications from simple low-resolution and low-band width applications to very high-resolution and high-bandwidth [1]. (F2 UTHM)	(citations required)
1 2 3 4	Acoustic analysis and detection of vocal fold pathology have undergone substantial research and development in the last three decades.	Move 1 Establishing a territory
5 6	The vocal fold pathology has to be diagnosed in the early stage.	Topic generalization with increasing specificity
7 8 9 10 11 12	To detect the vocal fold pathology, ENT clinicians and speech therapists use subjective techniques or invasive methods such as the direct inspection of the vocal folds and the observation of the vocal folds by endoscopic instruments [1]. (F12 UniMAP1 MJCS9)	(citations required)

The following Table 4.4 illustrates the findings of Move 1 occurrence according to the university group.

Table 4.1

Findings on M1 by the university groups

University Group	Percentages
Apex University	80%
Comprehensive University	90%
Research University	100%
Focus University	100%
Private University	96%
Total	94%

Table 4.4 shows that the percentage for the overall utilization of Move 1 is at 94%. None of the research article in from the Research University and the Focus University groups failed to employ this move. The comprehensive university and the private university fulfilled this strategy at 90% and 96 % respectively. The lowest occurrence for this move is by the Apex university which is at 90%. Despite the differences in the percentage, all the universities have this move as an obligatory strategy.

Similarly, the percentage of occurrence for this move according to the journal type also indicated this move as an obligatory strategy. All of the research articles in Malaysian Journal of Computer Science utilized this move with the percentage at 100%. Whereas, 95% of the research articles in the Pertanika journal employed this move. The percentage is almost similar; implying both journals are on the same note in utilizing this strategy. The percentages of

occurrence for this move in both journals were more than 90% thus suggested that this move is obligatory in the research articles of this study.

Likewise, analysis of the findings for this move according to the citation index also indicates that his move is an obligatory move for both groups. Both research article groups of high and low citation have this move at more than 90% occurrence. This highly cited research articles used this move at 97% and the research articles with low citation realized this move at 91%.

The analysis of the findings for this move according to the subdisciplines also indicates that this move is obligatory for both groups. The computer science discipline and the sub discipline of Computer Science realized this move at 95% and 92% respectively. In brief, this move was used as an obligatory move in the research articles of this study.

Findings from the interviews also concurred that citation is important and necessary in establishing the research introduction. Interviewee S said "**banyak saya cite selalunya dekat situ is article article yang principle la" <** most of my principle citation is cited here> (line 31). She added "**Selalunya dalam article dianya introduction, dia ada the past ee.. previous..previous apa ee? Previous work"** < Usually in the introductions of the article, they have the past.. ee previous ..Previos what's that? Previous work> (lines 95-96). She further added that the cited works are usually by "the key person in the area" (line 33). In other words, Interviewee S agreed that "Principle articles" and "previous work" needed to be cited in the introduction section, particularly the

works of “the key person in the area”. She suggests that emphasis must be given on “the importance of the subject to the current trend” (lines 49 -50). The writer relayed that the awareness on the importance of this consideration was learned from courses during the postgraduate study “**Selalunya from courses pun sama la.. masa kita studies betul betul kan”** <usually from the courses attended during the study> (line 57). The guidance from the courses indicates that the act of citing the work of others in the introduction section was a practice that is widespread amongst the research writers as this awareness has been clarified in the academic writing courses.

Interviewees N and K also expressed that citing other peoples work is necessary to establish the “background study” (Transcription N line 28-29). Interviewee K added **“kita akan bagi sinario semasa for example... and then sinario semasa ni ada related tak dengan.. err yang orang tengah research sekarang ni. Jadi orang nak try buat improvement kan. macam yang related dengan article I tengah tulis ni berkaitan related dengan masalah semasa lepas tu I support apa yang I cakap ni dengan err macam news paper article”** < we give the current contextfor example.. and whether the current contaxt is related with..eerr other people’s research. So people are trying to make improvements right.. like if it is realted with what I am writing, related with the current problem and after that I support what I have said using err news paper articles> (line 29-33). Interviewee K expressed that the cited works must be related to the current research and related to the current problems. This interviewee prefered to use articles from the news paper for this purpose because the facts are more

recent. The issues are also relevant as the issues are real problems that need to be resolved and interesting. In short, the interview findings indicate that the writers are aware that citation is necessary in establishing the background of the study.

Both findings from the interviews and the move analysis indicated that this move is prevalent in the research article introduction. And the move analysis also found how this prevalent move was utilized by the writers. The analysis on Move 1 in the research articles found that Move 1*Establishing a territory* was realized using a few techniques. These are the three techniques that were employed to accomplish this move in the research articles.

1. By providing description related to the study
2. By giving definition related to the study
3. By commenting on the general topic of the research.

The following excerpt (USM19UniMAP42P18) is an example on how Move 1 is fulfilled by using the three ways mentioned above.

> "Thermoplastic elastomers (TPEs) are advanced polymeric materials with fill the gap between an elastomer and plastomer which is crystalline (Golden et al., 1996). Its combined properties in strength and toughness have attracted many researches in this area. Besides, TPE has also been found to be cheap, recyclable, biodegradable, and environmentally friendly (Paul and Newman, 1978)."
>
> (USM19 UniMAP4 2P18)

This excerpt captures the first few sentences written in a research article entitled "The Effect of Polypropylene Maleic Anhydride (Ppmah) on Properties of

Polypropylene (Pp)/Recycled Acrylonitrile Butadiene Rubber (Nbr r)/ Rice Husk Powder (Rhp) Composites". In this first sentence, the writer has realized Move 1 by giving the definition of the "Thermoplastic elatomers". The definition given is not to be confused with Move 3 Step 3 which is "Definitional clarification". The main reason is, the item being defined was not at the niche level but rather is at the general issue level. By giving the definition of the item, a research area is created and the research territory is marked whereby the cue and link is established with the interested research community.

The second way of realizing Move 1 which is by giving description can be illustrated using the next sentence in line 3 of the same quotation (USM19). The second sentence in the research article (USM19) described the quality of the item as having "strength and toughness" and then added a comment of "attracted many researches in this area". By describing the quality and adding comment to a general topic the writers has reinforced Move 1 with more specificity to the niche. Here the comment is followed by a citation. In line 5 as in the example above, "Besides, TPE has also been found to be cheap, recyclable, biodegradable, and environmentally friendly (Paul and Newman, 1978)". Again the writer substantiates Move 1 made by adding more specificity and increasing the details to prepare the ground for the niche topic. This excerpt (USM19UniMAP42P18) employs all the three techniques. Some research articles employed only one or two techniques in realizing Move 1.

The next sections describe the finding on the use of citation in Move 1.

4.2.1.1 The use of citation in Move 1

In this section, the findings on the use of citation in Move 1 are presented. First, the percentage on the citation used for move 1 was given, and then, the excerpts that showed the severity of not utilizing this step in Move 1 is explained. After that, the percentages of occurrence for Move 1 according to the university group and journal type are given.

Another phenomenon discovered in this study is on the use of citation for Move 1. CARS model (Swales, 2004) posits that Move 1 is accompanied by "citation required". However, it was discovered that even though the research articles fulfilled the strategy on establishing the research territory by making topic generalization and increasing the specificity of the topic, many of the research articles did not have the required citation. 25 research articles or 16.7% of the research articles have delayed the citation up to the fifth sentence and as late as the 17th sentence. The details on the citation in the Introduction section are summarized in the table below.

Table 4.2

Findings on citation in Move 1

	Count	Percentage
Realization of Move1	141	94%
MI- Citation	96	64%
M1- Delayed citation	25	16.7%
Move 1 – No Citation	22	14.7%
No citation made in Introduction section	7	4.7%

As indicated in Table 4.5 14.7% of Move 1 made in the research articles did not have any citation at all; instead the citation only appeared in Move 2 where the discussion has developed to the niche level. More surprisingly, 4.7% or 7 of the research articles did not include any citation at all in the entire Introduction section. Only 64% of the research articles in the corpus used citation as suggested in CARS model (Swales, 2004).

The need for citations even during the initial part of the introduction is necessary, even when the topic is being written on the general level. When the writers establish the research territory by writing on the general topics, the writers are addressing a bigger readership compared to writing directly on the research niche. By addressing on the general domain first, bigger readership can be expected and then by writing with increasing specificity to the niche, this group of readership can be drawn to the niche of the study. If the writer dives straight to writing on the niche, some readers who are not familiar with the terms of the niche may be put off; not realizing the possible link and extension that the particular niche has with the readers' interest. As such by missing Move 1, the research article may miss out a number of potential readers and future citations. Given that Move 1 provides the link and extension with the bigger research domain and readership, it is understood why CARS model (2004) explicitly posits that citation is required. Citation must be used especially when citing the previous work at this point established the association and connection to what Shehzad (2012:22) described as the "research cult". The following

quotation is used to illustrate the importance of citation, even when at the initial level of establishing the research territory.

> "Data envelopment analysis (DEA) is a powerful tool for assessing the performance of organizations and their functional units. DEA spans the boundaries of several academic areas including management science, operational research, economics and mathematics. DEA is a non-parametric technique for measuring the relative efficiencies of a set of decision-making units (DMUs) which consume multiple-inputs to produce multiple-outputs. The main idea is to evaluate the relative efficiency of a set of homogenous DMUs by using a ratio of the weighted sum of outputs to the weighted sum of inputs. It generalizes the usual efficiency measurement from a single-input, single-output ratio to a multiple-input, multiple-output ratio. This technique was originally introduced by Farell (1957) and popularized by Charnes, Cooper, and Rhodes (1978) (CCR model)."
>
> (USM13)

In this excerpt (USM13), the citation has been delayed to the 6th sentence which is in line 15. The Introduction begins with Move 1 by giving description on the general research topic which is DEA. And then the research article offers a definition for DEA and this definition is considered as Move 1, not Move 3 Step3 which is "definitional clarifications". The reason is because the niche of the research article based on the title is "decision-making units" and "fuzzy concept", so the term being defined is still at topic generalization level and not yet at the specific niche level. Notice that the citation only comes in after a few sentences later. No citation was made for the definition, description or comments on the general topic. The citation is considered delayed because citation on the definition, description and comments linked the writing to the

existing literature and body of research. Having the citation delayed caused the connection and association to be established at a later reading sequence and appeared less connected.

The following example from research article (UiTM1) is on the Move 1 with no citation. The citation comes in the 17th sentence and in Move 2.

"Robotic grippers and manipulators are widely used all over the world to perform various tasks especially in industrial application for repetitive and dangerous working atmosphere. Robot interactions with surrounding environments present special challenge since they are complex, dynamic, uncontrolled and difficult to perceive reliably. Hence, skills and active sensing system needed by a robot to realize contact sense with environments. However most of the grippers used to date are of the passive gripper, which means that they are operated based on constant gripping force. The use of passive gripper is therefore limited to be used to handle hard objects and the gripping force need to be reprogrammed if the different object of different hardness need to be handled. With the advancement in robotic research, more and more capability of robot is developed to perform various tasks that need manipulation skills such as in medical operation, humanoid robots and household work. The range of object hardness also changes instantly while the robot performing its duty. These applications need an active gripper, which can react to the variable force or pressure just like the humans tactile sensing capability. As convincingly demonstrates by a blind people, tactile sensing alone can support extremely sophisticated manipulation. Tactile sensing is the process of determining physical properties and events through contact with objects in the world. It is an essential sensory device to support the robot control system particularly in object manipulation task. Many traditional sensing technologies seem do not fit the requirements of robot manipulation in human environments due to lack of sensitivity, dynamic range and material strength. Several researches have been carried out in various research institutions all over the world to develop a better tactile sensor. Research team at Massachuset Institute of Technology (MIT) has developed sensor with a protruding shape that allows them to easily make contact with the world in a similar way to the ridges of a human fingerprint. The sensor can estimate the

magnitude and direction of applied forces with great sensitivity by measuring the deformation of the compliant dome. A research team at Tokyo University developed the skin-type conformable and scalable tactile sensor consists of a photo reflector covered by urethane foam and organized as a network of selfcontained module that communicates through a serial bus. A research team at Nagoya University developed a novel optical three axes tactile sensor system based on an optical waveguide transduction method capable of acquiring normal and shear force (Ohka *et al*., 2004)."

(UiTM1)

In this excerpt (UiTM1) 16 sentences prior to the last one, do not have any citation. Not having any citation also presents vagueness to the ownership of the ideas. For example in line 32 to line 35, the sentence of "Research team at Massachussets Institute of Technology (MIT) has developed sensor with a protruding shape that allows them to easily make contact with the world in a similar way to the ridges of a human fingerprint.", it is unclear whether the fact has been ascertain by the writer or has been established by Ohka et al, whose name appears at the end of the few sentences later. Another example is in line 34 to 36 which is the sentence of "Several researches have been carried out in various research institutions all over the world to develop a better tactile sensor." Here, no citation is made to support the claims that several researchers have been carried out. By giving citation to "several researches" in the sentence, connection can be established with the existing body of research. In short, delay or omission of citation in Move 1 is a deficiency and may appear like a lack of involvement and ambiguous ownership of ideas.

While the move analysis and the interview findings indicated that the writers are aware that citation is necessary in establishing the background of the study, the

findings on the use of citation suggest that the utilization of Move 1 for this group of writers need to be improved. Even though Move 1 has been utilized by the writers, there is room for improvement on the use of citation for this move because the citation has been delayed and omitted in some of the research articles.

In the next section, the findings of the next move which is Move 2: Establishing a niche is presented.

4.2.2 Move 2: Establishing a niche

In this section, the findings for the move analysis and interview of Move 2 "Establishing a niche" are presented. The overall percentage of occurrence is presented. And then, the findings of the move according to the steps are presented in the sub sections.

After Move 1, the next move in CARS (Swales, 2004) model is "Move 2 Establishing a niche (Citation Possible)." The niche needs to be established in the research article writing because the establishment makes the paper identifiable to the exclusive research area in focus. The niche restricts the discussion to the specialized area of research and expresses details on the definite study. It highlights in the introduction of the research article; the specific and specialized feature that would be in focus. CARS model (Swales, 2004) posits that the niche in the introduction section of a research article can be established in a few steps*: Step 1A Indicating a gap, Step 1B Adding to what is known, Step2 Presenting positive justification.* After realizing Move 1 which

states the general research area, these steps can be used to set up, construct and compose further introduction on the specialized area. The findings for this study on Move 2 are as in Table 4.6

Table 4.3

Findings on realization of Move 2 and Steps

Realization	Percentages
Move 2 Establishing a niche (Citation possible)	100%
Step 1A Indicating a gap	73%
Step 1B Adding to what is known	99%
Step 2 Presenting positive justification	62%

The percentage reported in the table concludes that Move 2 is present in all the research articles in the study. All of the research articles have successfully established the specialized area of the research in the Introduction section. The most frequent step used to realize Move 2 is via "Adding to what is known" followed by "Indicating a gap". In accomplishing Move 2, "Presenting positive justification" appears to be the least preferred method. The details on the various steps used are discussed in the following section 4.2.2.1 and 4.2.2.2.

4.2.2.1 Move 2 Step 1A: Indicating a gap

This section begins with how this step is realized. And then, the percentage of occurrence according to the university groups, journal types, citation index and subdisciplines are presented followed by the findings of the interview. Finally this section describes the four identified techniques that have been used to realize Move 2 Step 1A in the research articles in the corpus. One of the ways to accomplish Move 2 is by realizing Step 1A which is "Indicating a gap".

Indicating a gap entails the writer to recount the research area and point out the research space which exists in the body of research. The writer tries to convince that research space revealed requires further investigation and is worth studying. The research area which is described in general in Move 1 is elaborated further with growing specificity then the description delves into the niche. While giving the account on the niche area, the research gap is identified, the research space is created and the necessity for the intended study is composed. The act of indicating the gap is described as "builds up a "demand" for current contribution" (Shehzad 2008:, p.6).

Table 4.7 shows the findings on realization of Move 2 and Steps by the University groups. For Move 2 Step 1A, it shows that 73% of the research articles have utilized this step. It is found that the Research university group has the highest percentage of utilizing Move 2 Step 1A *Establishing a niche: Indicating a gap*.

Table 4.4

Findings on realization of Move 2 and steps by university groups

University Group	Move 2	Move 2 Step 1A	Move 2 Step 1B	Move 2 Step 2
Apex University	100	70	95	75
Comprehensive University	100	38	100	55
Research University	100	82	100	53
Focus University	100	75	100	62
Private University	100	70	100	62
Total`	100	73	99	62

The reason could be due to the competitive research environment in the research universities. The research universities as explained earlier are designated to produce a bigger number of researches and are allocated with more funds (Aizan, Rosna, Nurahimah, Chan and Doria, 2014). The pressure to publish more research articles are great hence the writers need to establish the research gap that is worth investigating. The Apex University, Focus university and Private university group also showed a good percentage of occurrences. Shehzad (2008) linked the big percentage to the general increase of Computer Science research which pressures the writers to create a research space for their work. Given that the Research university group is having a bigger role and expectation, the pressure is higher on this group hence, creating the bigger number of percentage. However, the findings indicated that the research articles from the Comprehensive university group had the lowest percentage on the utilization of this strategy. 'Indicating a gap' is only used by 38% of the research articles. Thus brings on to the suggestion that the writers of this group needed more encouragement in using this step by the writing instructors.

In analysing the finding according to the journal type, it was found that research articles in both journals used this step as an optional move. The Malaysian Journal of Computer Science and the Pertanika journal have the realization at 78% and 71% respectively. Similarly, the analysis according to the Computer Science and Computer Science subdisciplines also found that indicating a gap is practiced as an optional step by the writers of both groups. The Computer Science group utilized this step at 70% whereas 68% of the research articles

introduction in the Computer Science subdisciplines group. Likewise, the research articles with high citation and low citation also have this move as an optional step. However, the differences in percentage between these two groups are bigger. The research articles with high citation realized this step at 86% while only 71% of the research articles with low citation utilized this step.

All in all, the findings of the move analysis suggest that Move 2 Step 1 "Establishing a niche: Indicating a gap" is utilized as an optional move in the research articles in this study.

Interview findings suggested that "indicating a gap" is a practice amongst the interviewees. Interviewee N stated **"Lepas Problem statement lepas tu a... cite a bit apa yang the previous study yang orang dah di buat atau pun pasal the limitation and then a... cite kenapa kita buat? Sebab dia orang ada limitation tu sebab tu kita kena buat undertake that research"** < After problem statement,, after that, cite what people have done in the previous studies or the limitation.. aa cite why are we doing this? Because those work has limitation, that is why we must undertake that research> (lines 42-46). In this case, Interviewee N emphasized that after citing the previous work, the limitation of the existing study must be put clearly because stating the limitation clearly gives the reason to undertake the present study.

Interviewee K perceived that after describing the existing studies, problem of the study need to be mentioned in the Introduction section. "**kita elaboratekan kat paragraph paragraph setrusnya kan..macam kita akan buat solution based**

on this problem , this issue kan than kita akan elaborate la apa apa propose solution kita." <We can inform the people how important this new thing is , and then we can elaborate in the following paragraphs (sections). Like we are giving solution to the problems in the issue and then, we can elaborate our proposed solution> (line52-53). In short, Interviewee K is aware that the propose solution and improvement to the problem must be stated in the introduction. The thoughts by the interviewees K and N on highlighting the problem and limitations of the existing study in relation to indicating a research gap are reflected in the following findings.

Analysis of the findings identified that the writers have used various techniques to establish the research gap. The techniques used to realize the step of "indicating a research gap" can be classified in a four categories, mainly by:

1. Indicating limitation in the research area
2. Suggesting a problem that needs to be solved
3. Conveying the suggestions of research by previous researchers
4. Extending the works of others.

The following sections illustrate some examples of establishing the research gap found in the research article introductions of the study. The first one is indicating limitation in the research area, followed by suggesting a problem that needs to be solved, conveying the suggestions of research by previous researchers and finally by extending the works of others.

Indicating limitation in the research area

This section describes one of the identified techniques on how *indicating a gap* was realized in the research article introductions of this study. Indicating limitation in the research area is mostly done in a few sentences that flow from expressing the area that has been studied followed by the claim that not enough has been done. In the corpus of this study, to accomplish this step, the expression is lengthy but the message on the limited effort carried out in the area is clear. This technique has also been reported to emerge in the corpus of the study by Kanoksilapatham (2005: 275) who describes the strategy as "...draw(ing) scientist attention to weakness in the existing literature and asserts... requires an answer". The following quotes are some of the examples on how this technique on indicating limitation in the research area is used to accomplish this step.

> From historical times, carrageen and alginates from seaweeds are used for medicinal purposes. In spite of their usefulness, unfortunately only a little work has been done on the incorporation of seaweed in formulated feeds of freshwater cultivable fishes.
>
> (F19 UMT4 Pertanika2P3)

In the first sentence of this excerpt (F19 UMT Pertanika2P3) the writer has initiated niche idea which is the 'seaweeds' by stating that the uses of seaweeds have been in practice for medicinal purposes. After pointing out that the work in this area has been in practice, the writer proceeded to indicate the limitation in the research area thus, accomplishing the step on *Indicating a gap*. In this

excerpt the writer has used the Adversative conjunction 'In spite of' to shift the strategy from initiating the niche area to indicate the limitation in the research gap. And then the writer completed the step by stating 'a little work has been done on' (lines 3-4). Another example on how *Indicating limitation in the research area* is used to accomplish the step on *Indicating a gap* is in the following excerpt (UM4).

> While effects of the cigarette smoke on proteins 1
> expressed in the bronchoalveolar lavage [36–38], 2
> nasal lavage fluid [39], urine [40], lung tissue [41], 3
> bronchial airway epithelium and pooled exhaled 4
> breath condensate samples [42] have been analyzed, 5
> little information is available regarding the effects of 6
> smoking on the whole saliva proteome. 7
>
> (UM4)

In this example (UM4) the writer has used the Adversative conjunction 'While' and then proceed to indicate the limitation of the research done in the area hence accomplishing the step on *Indicating a gap* by stating 'little information is available regarding...' (lines 5-6). The following excerpt (UM4) also highlighted the research gap by suggesting the limitation in the research area as in "there had been no reported studies that" (lines 1-2). The full sentence on this step is as follows.

> "To the best of our knowledge, there had been no 1
> reported studies that specifically compared the 2
> expression of proteins in the saliva of smokers and 3
> non-smokers". 4
>
> (UM4)

The writers of the research articles in this study have also some attempted to give a critical review on the previous research as follows.

Saif & Guan [13] aggregated the faults and disturbances to form a new fault' vector and used a linear unknown input observer to reconstruct the new 'fault' vector. Although this successfully decouples the disturbances from the fault reconstruction, it requires very stringent conditions to be fulfilled, and is conservative because the disturbance does not need to be reconstructed, only rejected/decoupled.	1 2 3 4 5 6 7 8 9
IIUM8	

In this excerpt (IIUM8) the writer has acknowledged the works that have been done in the area by stating "...this successfully decouples the disturbances from the fault reconstruction..." and then proceeded to point out the problems concerning the works that have been done by the previous researchers as in "it requires very stringent conditions to be fulfilled, and is conservative because the disturbance does not need to be reconstructed, only rejected/decoupled" (lines 4-7). Again the use of adversative conjunction which in this case is "Although" has highlighted the contrast between the two ideas in the sentence. The act of pointing out the unresolved problems despite the previous research done has effectively signified the research gap.

In the following excerpt (F13UniMAP), similar pattern of using adversative conjunction has been made in revealing the research gap.

Many codes have been proposed for OCDMA such as Optical Orthogonal Codes (OOCs) [1], prime codes, and Modified Frequency Hopping (MFH) codes [8]. However, these codes suffer from various limitations one way or another. The codes' constructions are either complicated (e.g., OOC and MFH codes), the cross-correlation are not ideal (e.g., Hadamard and Prime codes), or the code length is too long (e.g., OOC and Prime code).

(F13 UniMAP2)

Similar to example (IIUM8), the writers of (F13UniMAP2) acknowledged the works that have been done in the area by stating "...Many codes have been proposed for OCDMA such as Optical Orthogonal Codes (OOCs) [1], prime codes, and Modified Frequency Hopping (MFH) codes [8]" (lines 1-2) and then proceeded to point out the problems concerning the works that have been done by the previous researchers as in "complicated" (line 6), "not ideal" (line 7) and "code length is too long" (line 9). The use of adversative conjunction "However" (line 4) has signified the limitations that still exist in the research area. On top of this, the writers of (F13UniMAP2) have attempted on giving a critical view on the previous work by stating "However, these codes suffer from various limitations one way or another" (lines 4-5).

The examples (F19UMTPertanika2P3, UM4, IIUM8, F13UniMAP) indicated an emerging pattern on how Move 2 *Establishing a niche* using step 1A *Indicating a gap* has been accomplished by the Computer Science research article writers.

Posteguillo (1999) also reports on the frequent use of expressing limitation in the research articles studied and pointed out the word "however" is used most repeatedly in accomplishing this step. Similarly, the word "However" has also been found to be used regularly in realizing this step in this corpus. Some of the examples are quoted below:

> By basing on the description of the traffic patterns, the control system is made adaptive, resulting in adjustment in the hall call assignment strategy. However, these approaches were heavily dependent on the accuracy and correctness of traffic pattern predictions. (UM7)

> DPR has been widely studied in various fields [4–18]. However, current DPR design flows and implementations are not capable to provide a set of programs to establish communication between the FPGA and host computer. (F2 UTHM2)

> "However, it can also be necessary to recognize the handwritten authorship without signature, such as in case of threatening let-ter, (sic) authorship determination of an old or historical manuscript." (F6 UTEM2)

> "...they are potentially good in finding high-quality solutions. However, they can be quite inefficient too in the use of computational resources." (UM7)

The examples above show the usage of "however" in accomplishing the move of *indicating a gap*. Most of the time, the position of the word is at the beginning of the sentence. The prior sentence usually states the existence of the current research in the area and the word "However" highlights on the limitation of the existing research.

In short, the first identified technique on how to realize *indicating a gap* in the research article introductions of this study is by *Indicating limitation in the research area*. To highlight the research gap, the this techniques was found realized by using adversative conjunction, by using various applications of the conjunction "however" , by giving direct statement on lack of study, and by giving a critical view on the previous works.

Suggesting a problem that needs to be solved

In indicating a research gap, apart from addressing the limitation in the research area as explained in the previous sub section, a second technique was also identified. The technique is by suggesting a problem that needs to be solved. The research gap can be signified by suggesting the problem that needs to be solved. The need for difficulty or challenge to be resolved or improved is conveyed and then the advantage of resolving the problem or the disadvantage of not solving the problem is presented. The following quotes illustrate on the way the step is realized in some of the articles using this method.

> Therefore, <u>there is a need for</u> a technique in data clustering to improve the accuracy and computational complexity
>
> (F1 UTHM1)

In this excerpt (F1 UTHM1) the writers have suggested "a need for a technique" next; the writers proceeded to suggest the advantage of meeting the need which is "to improve the accuracy and computational complexity". The pattern of highlighting the problem that needs to be solved is usually followed by an indicative solution or advantage. This pattern also prevailed in the following examples (F2UTHM2) and (F1UTHM1)

> Time and massive amount of data to be processed have resulted in vast challenges from a hardware implementation point of view. In order to address these issues, FPGAs with an efficient reconfigurability mechanism should be deployed to meet the requirements in terms of speed, area(size), power consumption and throughput.
>
> (F2UTHM2)

In the example above (F2UTHM2), similar pattern of highlighting the problem that needs to be solved followed by a suggestion on the solution or advantage has emerged. The problem highlighted was "Time and massive amount of data to be processed have resulted in vast challenges" and then the suggested solution of "FPGAs with an efficient reconfigurability mechanism" was made.

However, in the following example (F1UTHM1) only part of the pattern materialized, nevertheless, the act of 'suggesting a problem that need to be solved' still managed to make the effect of "Indicating a gap"

> It has been shown in Section 4.1 that TR and MMR have the same result in selecting clustering attribute. With this

technique, the complexity is however still an issue due to all attributes are considered to obtain the clustering attribute.

(F1 UTHM1)

In this example (F1 UTHM1), the writer suggested the problem that needs to be solved as in "the complexity is however still an issue". Unlike the example prior to this (F2UTHM2), the writer did not proceed to suggest any solution for the problem or suggest any advantage for solving the problem highlighted; nevertheless the suggestion on the problem alone was meaningful enough to indicate the research gap.

Conveying the suggestions of research by the previous researchers

Conveying the suggestions by previous researchers has also been identified as one of the ways for the writers to establish the research gap. Limitations in the past studies are used to specify on the particular research space. The writers do not directly point out the inadequacy but rather, use citation on previous work to do so. This technique also appears in the corpus of study by Shehzad (2008) In this technique, the "...weaknesses and shortcomings found by previous research..." is used to "serve as a background" for the intended work. (Shehzad 2008:33) The following quotes illustrate on how Move 2 is accomplished using this way.

Clearly, these limitations have contributed to the failure of DW projects [3][20]. (UUM1)

In the example above (UUM1), the inadequacy of the past studies was used to specify on the particular research gap as in the citation of "[3][20]". The writers did not directly point out the limitation of the research but rather, used citation on previous work to highlight on the research gap. In a way, the research gap is conveyed tactfully as suggestion by the previous researchers.

> Some established soft computing techniques applied by previous works to suggest the optimal cutting conditions for machining cutting problems are, for example, the genetic algorithm (GA), simulated annealing (SA), Tabu search (TS), ant colony optimization (ACO), and particle swarm optimization (PSO) (Aggarwal & Singh, 2005; Mukherjee & Ray, 2006). (UTM2)

In example (UTM2), the writers used the citation on the previous work to highlight the problems of "optimal cutting condition for machining cutting". The works of "Aggarwal & Singh, and Mukherjee & Ray" were cited to support the problems being highlighted.

Extending the works of others

Usually the works of others are mentioned first and then, the inadequacy in relation to the work is mentioned. Mentioning the inadequacy in the previous study creates a research space that is likely to be fulfilled. This technique is also detected in the corpus studied by Shehzad (2008). The research gap can also be from "the extension of the author's previous work" (Shehzad, 2008:34).

> Existing works in WI concentrate on feature extraction and classification task in order to identify the handwritten authorship. However, additional steps need to be performed in order to have a better representation of input prior to the classification task. (F6 UTEM2)

In this example (F6 UTEM2) Usually the works of others are brought up first as in "Existing works in WI concentrate on", and then, the inadequacy in relation to the work is mentioned as in "However, additional steps need to be performed in order to have a better representation". Mentioning the inadequacy in the previous study creates a research space that is likely to be fulfilled

> Huang [4] and Kim et al. [9] work in the area of applying fuzzy sets in clustering categorical data. However, these algorithms require multiple runs to establish the stability needed to obtain a satisfactory value for one parameter used to control the membership fuzziness [10].

(F1 UTHM1)

In this example (F1 UTHM1) previous work as in "Huang [4] and Kim et al. [9] work in the area of", and then, the shortcoming in relation to the work is mentioned as in "However, these algorithms require multiple runs to establish the stability needed". Mentioning the insufficiency in the previous study creates a research gap which comes in form of extending the works of others.

In short, in realizing the step on indicating a gap, four techniques were identified. The techniques used to realized the step of "indicating a research gap" can be classified in a four categories, mainly by indicating limitation in the

research area, by suggesting a problem that needs to be solved, by conveying the suggestions of research by previous researchers and by extending the works of others.

All in all, the step of "Indicating a gap" is part of Move 2 which is "Establishing a niche" and this step is used to identify the research space hence support that the intended study is necessary. 73% of the corpus in this study has realized in this step and the Research University group have the largest percentage of realization. The popularity of using this step amongst the Research University group writers is attributed to the competitive research environment which called for more publication. The interviewee suggested that limitation and problem of the study can be highlighted to indicate a research gap. Four techniques on how this step is realized in the corpus have been identified which are by indicating limitation in the research area, by suggesting a problem that needed to be solved, by conveying the suggestions of research by previous researchers and by extending the works of others and illustrated.

Another step for Move 2 *Establishing a niche* is using step 1B which is *Adding to what is known*. This step is explained in the following section.

4.2.2.2 Move 2 Step 1B: Adding to what is known

In this section, the findings for the move analysis of Move 2 Step 1B *Establishing a niche: Adding to what is know* are presented. The overall percentage of occurrence is discussed first and then this section continues with the percentage of occurrence for this step according to the university group,

journal type, high and low citations and Computer Science subdisciplines. Finally this section describes the three identified techniques that have been used to realize Move 2 Step 1B in the research articles in the corpus

While Swales listed 3 possible strategies in establishing the research niche, the most popular strategy taken by the writers in this study is Move 2 Step1B which is by *Adding to what is known*. After establishing the research territory, the writers zoom into the specialized area of the studies by giving more information which is related to the niche area. Computer science discipline is known to be one of the most robust, infused with new concepts, terminology and growing technologies (Denning, 1999) where obsoleteness occurs at daily basis. The researchers in Computer Science discipline need to establish a niche that would enable them to be accepted in the dynamic and ever changing research plains. The importance of establishing the niche has also been highlighted by the other researchers "Computer scientist have to find a strong "niche" to increase the chances of their audience's acceptability and target community's recognition of their research work which is essential for scientific progress" (Shehzad, 2008:47).

In this study, 100% or 150 of the research articles have successfully realized *Move2: Establishing a Niche* by utilizing 'Step 21B *Adding to what is known*. The following quote (F12 UniMAP1 MJCS9) is used to illustrate on how the step is fulfilled in one of the research articles.

1 "In the bibliography, there are (sic) many algorithms have been
2 found for the automatic detection of vocal fold pathology by means
3 of long-time signal analysis [1-5]. In recent years, more modern
4 approaches have been invented which use short-time speech analysis
5 or Electroglottograph (EGG) signals [6-8]. The short-time acoustical
6 features extracted from the EGG signal can be examined to depict
7 the aspects of normal or abnormal vocal fold vibration motion. **The**
8 **proper diagnosis of vocal fold pathology is essential."**

F12 UniMAP1 MJCS9

In this example (F12 UniMAP1 MJCS9), the first sentence the research topic is mentioned at the general level using the first phrase of "In the bibliography, there are (sic) many algorithms have been found for the automatic detection of vocal fold pathology" and the specificity has increased in the second phrase of the sentence "...by means of long-time signal analysis [1-5]". The citation from line 1 to line 3 shows that the research topic has been studied, researched and published by others. The citation also indicates that there is a ready research community for this topic. Move 2 is made in the second sentence from line 3 to line 5 where the niche is established by introducing the research niche "In recent years, more modern approaches have been invented which use short-time speech analysis or Electroglottograph (EGG) signals [6-8]." In the second part of the sentence in line 5, the niche of the research which is EEG is mentioned. The three citations are also given and these citations again reinforced the idea that this niche is within the existing research and do have some ready research community and followers.

Move 2 Step 1B is about adding to what is known and the writer accomplished this by adding more information to the previous cited fact in the following sentence from line 5 to line 7 which is "The short-time acoustical features

extracted from the EGG signal can be examined to depict the aspects of normal or abnormal vocal fold vibration motion". After adding more information to the previously cited fact, the writer has reinforced the importance of the niche and the possibilities in this area in line 7 to 8 by stating "The proper diagnosis of vocal fold pathology is essential". The niche is established and the writer has fulfilled Move 2 using step 1B which is *Adding to what is known*. These are a few more examples that capture on how this step has been used in some of the research articles.

> "Activated carbons are recognized as an essential component for the electrode of an electric double layer capacitor (EDLC) (Bonnefoi et al., 1999; Qu and Shi, 1998; Oh, Korai and Mochida, 1999; Hal-Bon Gu, Jong-Uk Kim and Hee-Woong Song, 2000). Activated carbon (AC) is the electrode material used most frequently for EDLCs due to the low cost, high surface area, availability, and established production technologies (Nishino, 1996). The activated carbon grains are mixed with binder, cured (stabilized) and carbonized into an activated carbon artifact so as to be connected to the collector." (P20 2P10)

In the example above (P20 2P10), the entire sentence in the quotation is *Move 2 Step 1B : Establishing a niche via adding to what is known*. The niche of the paper is "Activated carbon" which can be implied from the research article title of "Symmetrical Supercapacitor using Coconut Shell-Based Activated Carbon". In the extract above (line 1), the niche of the research which is "Activated carbon" is mentioned, followed by many citations from line 2 to line 4 which reinforced the effect of the niche formation made. Next, the writer added to what is known in the last sentence of "The activated carbon grains are mixed with binder, cured (stabilized) and carbonized into an activated carbon artifact (sic) so as to be connected to the collector" from line 8 to line 10. As such, the writer

has successfully realized *Move 2 Step 1B which is Establishing a niche via Adding to what is known.* The percentages on realization of Move 2 using Step1B are presented in Table 4.8.

Table 4.5

Findings on Move 2 Step1B by the university group

University Group	Move 2 Step 1B
Apex University	95
Comprehensive University	100
Research University	100
Focus University	100
Private University	100

Table 4.8 reveals that in this study, all of the research articles have employed Step1B to realize Move2. Using the scale employed by the previous researchers (Kanoksilapatham, 2007; Sheldon, 2011; Soler-Monreal, Carbonell-Olivares, & Gil-Salom, 2011), the 100% occurrences make this step as an obligatory step for the research articles in this corpus.

Similarly, the research articles with high and low citation also have 100% occurrence. Likewise, the research articles of Computer Science discipline and Computer Science subdisciplines all have 100% realization for this step.

With 100% occurrences, Step1B undoubtedly also meets the criteria of being an obligatory step for this particular corpus. In relation to this view, the results based on the publication made for two journals published by Malaysian universities are compared.

Table 4.6

Findings of Move2 Step 1A and 1B by the journal type

Journal Name	Pertanika Science and Technology (N=38)	Malaysian Journal of Computer Science (N=14)
Count for M2S1A Establishing a niche Via Indicating a gap	27	11
Percentages	71%	78%
Count for M2S1B Establishing a niche Via Adding to what is know	38	14
Percentages	100%	100%

Comparing the findings on both steps for Move 2 according to the journal title it can be seen that both journals have similar number of occurrences for these steps. The percentages show that the research articles in these journals have accomplished both steps for Move 2 to the obligatory level which is at par to the model of the native writers. Despite the fact that the journals are published by Malaysian universities, the writers of these journals conformed to the native model of writing by having both steps as obligatory. This reinforced the inference that having the global readership as audience is in forced among the writers of the research articles in this corpus.

The step on *Adding to what is known* has been accomplished by adding more information to the statement cited earlier. In realizing this step, the writers supplement the information cited in the previous research with original comments and ideas. The following strategies have been identified as some of the ways on how *Move2 Step 1B* which is *Adding to what is known* is realized in the corpus of the study. *Move2Step1B* were found to be realized by the following acts.

1. Giving information and ideas with no citation.

2. Adding comments and ideas to the cited work.

3. Developing the idea from cited work by adding other cited works

Giving information and ideas with no citation.

In realizing *Move 2 Step1B Establishing a niche: Adding to what is known* the writers zoom into the specialized area of the studies by giving more information which is related to the niche area. One of the way to accomplish this is by giving information and ideas with no citation. The following excerpts (F13 UniMAP2) illustrate how this act is realized

> "There are a number of different techniques to implement OCDMA. One technique is where a broad band of light is used, and the spectral amplitude of a source is modulated with Random Diagonal (RD) code that specifies certain components of the spectrum to be one and off. In such a network, different transmitters use different codes."
>
> (F13 UniMAP2)

In the example above (F13 UniMAP2), the writer has stated the research niche which is "There are a number of different techniques to implement OCDMA" and then the writer elaborated on the research niche technique by listing out the technique as in "One technique is where a broad band of light is used, and the spectral amplitude of a source is modulated with Random Diagonal (RD) code..". The step of *Adding to what is known* is further supported with more information and ideas from the writer as in "...that specifies certain components of the spectrum to be one and off. In such a network, different transmitters use

different codes." Using this act to support the step, the idea and information were given as it is and the writer did not use any citation or reference to the previous work.

Adding comments and ideas to the cited work.

Another way of realizing *Step1B Adding to what is known* is by adding comments ands idea to the cited work as illustrated in the following excerpt (F13 UniMAP2)

> "Since phase coding was very difficult to preserve in fiber, the technique of SAC with unipolar versions of the same bipolar code was proposed [4]. SAC schemes operates at bit rate, thus the requirement for receiver bandwidth is relaxed. Since low cost broadband source and detector can be used for network implementation, the cost for end users is more economical." (F13 UniMAP2)

In this excerpt (F13 UniMAP2) the niche is establish as in "Since phase coding was very difficult to preserve in fiber" and then the niche was supported with more information which is "the technique of SAC with unipolar versions of the same bipolar code was proposed [4]." At this point the additional information is cited to support the establishment of niche mentioned. In this context, the cited work is further elaborated by the writer. The elaboration was given by the writer without any reference or citation.

Developing the idea from cited work by adding other cited works

Another way of realizing the step of *Adding to what is known* is by developing the idea from cited work by adding other cited works. Similar to the previous act, this act involves using citation. However, unlike the previous act which was supported by elaboration made by the writer, this current act supported the elaboration by using more citations.

> "Fuzzy logic has been applied for safety analysis of power protection and automation system action (Manana, Toader, & Anatoli, 2004). The fuzzy expert system was proposed for voltage instability control to calculate the optimum and minimum ratio of load shedding (Sallam & Khafaga, 2002). In addition, a fuzzy logic stabilizer has been developed for stability control of a 1 kVA laboratory scale model of power system (Saud, Adel, & Abdullaziz, 2005)." (F7 UMP 1)

In the excerpt (F7 UMP1), the niche "fuzzy logic" has been introduced. The writer proceeded by elaborating on the concept as in "Fuzzy logic has been applied for safety analysis of power protection and automation system action (Manana, Toader, & Anatoli, 2004)." Here, citation is used to support the niche establishment followed by another citation which expands the idea of fuzzy logic as in "The fuzzy expert system was proposed for voltage instability control to calculate the optimum and minimum ratio of load shedding (Sallam & Khafaga, 2002)". As the writer adds more to what is known, another citation is added to elaborate the idea further as in "In addition, a fuzzy logic stabilizer has been developed for stability control of a 1 kVA laboratory scale model of power

system (Saud, Adel, & Abdullaziz, 2005)". This excerpt has successfully completed Move2 Step 1B which is "Establishing a niche: Adding to what is known". The writer has successfully developed the idea from a cited work by adding other cited works.

In short, the findings for the move analysis of Move 2 Step 1B "Establishing a niche: Adding to what is known" indicates that M2S1B is prevalent in the research article introduction of this study. The overall percentage of occurrence at 100% suggests this step as an obligatory step for the research articles in this corpus. Similarly, the research articles with high and low citation also have 100% occurrence. Likewise, the research articles in journals Malaysian Journal of Computer Science and Pertanika journal, the research articles of Computer Science discipline and Computer Science subdisciplines all have 100% realization for this step. Move2Step1B were found to be realized by giving information and ideas with no citation, by adding comments and ideas to the cited work, and by developing the idea from cited work by adding other cited works.

The next section presents the findings for the "Recycling" element identified in the move analysis.

4.2.2.3 Recycling

In this section, the findings on Recycling Step are presented. First, the explanation on how the Recycling step is fulfilled in this corpus is given. And

then, the percentages of occurrence according to the university group, journal type, citation rate and Computer Science subdisciplines are presented.

Swales (2004: 230) proposed that the realizations of Move1 and Move2 may occur in a pattern of recycling. Recycling is the "potential cycling or iteration of Move 1 and Move 2 sequences". Swales (2004: 230) noted that recycling is "prevalent, especially in longer introductions". This iteration of moves occurs with "increasingly specific topics". The recurrence of Move 1 and Move 2 may happen more than once and with each repetition, the topic become more specific to the intended study. The excerpt below (USM15) is used to illustrate on how "Recycling" is utilized.

> As an activity for ensuring quality and improving reliability, software testing is an important phase in the software engineering lifecycle (**Move 1).** Lack of testing often leads to disastrous consequences **(M2S1A)** including loss of data, fortunes, and even lives **(M2S1B)**. For these reasons, many input parameters and system conditions need to be tested against the system's specifications for conformance. **(M2S2)** Although desirable, exhaustive testing can be prohibitive due to resource and timing constraints **(M2S1A).** Earlier works [1], [2] conclude that pairwise testing based on 2-way interaction of variables can be effective to detect most faults in a typical software system **(Move 1).** While this conclusion may be true for some systems, it cannot be generalized to all software system faults, **(M2S1A)** especially when there are significant interactions between variables **(M2S1B).** For example, the study by the National Institute of Standards and Technology (NIST) [2]-[4] reported that 95% of the actual faults on the test software involve 4-way interaction **(M2S1B).** In fact, all of the faults are detected with 6-way interaction [5], [6] **(M2S1B).**
>
> (USM15)

The title for the research article written by USM15 is "MC-MIPOG: A Parallel t-Way Test Generation Strategy for Multicore Systems". Based on the title, the

niches of the research area are on “t-Way Test Generation” and “Multicore Systems”. The first sentence of the introduction (lines 1-3) is identified as Move 1 because the sentence mentions about software testing which is the general topic of this research. In the second sentence of line 4, the research gap is indicated by suggesting a problem that needs to be solved.

The sentence of “Lack of testing often leads to disastrous consequences” in lines 3-4 is identifiable to move 2 Step 1A (M2S1A) and the next phrase in the sentence which is “including loss of data, fortunes, and even lives.” In lines 4 is where the writer proceed to Move 2 Step 1 B (M2S1B) which is “Adding to what is known”. And then, in lines 6 to 8, the writer proceeds to realized Move 2 Step 2 (M2S2) which is “Presenting positive justification” in the sentence of “For these reasons, many input parameters and system conditions need to be tested against the system’s specifications for conformance”. M2S2 is explained in detail in the next section (4.2.2.4).

What is important at this point is the subsequent act where the writer recycled to Move 1Step 1A again in line 8 to 9, by hinting on another problem in the sentence of “Although desirable, exhaustive testing can be prohibitive due to resource and timing constraints”. Notice that recycling is utilized again in the next sentence (lines 9 to 12) of “Earlier works [1], [2] conclude that pairwise testing based on 2-way interaction of variables can be effective to detect most faults in a typical software system”. In this instance, the general topic of testing is brought to focus again but this time with increasing specificity to “pairwise testing”. The writer has also successfully linked this general topic to the existing

research by inserting the citation of two previous works in line 9. After that the writer proceeded to indicate the research gap in that particular general topic by realizing Move 2 step 1A (lines 13 to 14) in the sentence of "While this conclusion may be true for some systems, it cannot be generalized to all software system faults,".

This research gap is again followed by Move 2 Step 1B (line 16) by giving additional information in the following phrase of "especially when there are significant interactions between variables". The following sentences add more information to what is being discussed. The act of iterative application of Move 1 to Move 2 has brought the discussion in more specific topics which are related to the intended study. This iterative act is how the *Recycling* is accomplished in one of the corpus. The rate of the *recycling* in the corpus according to the university group is reported in the table 4.10. Private University has the lowest Recycling percentage at 90%. The reason is because the research articles in this group have already utilized the other steps in Move 2.

Table 4.7

Percentage of Recycling by University group

University Group	Percentages
Apex University	100%
Comprehensive University	94%
Research University	96%
Focus University	100%
Private University	90%
Total	96

Private university has 100% occurrences for Move 2 Step 1B and 70% for Move 2 Step 1A. Even though the percentage for recycling is lower for Private

university group compared to other university groups, the percentage is still within the obligatory level.

Comparing the percentage of occurrence between the journal types indicates that both journals also have this step as an obligatory step. The percentage of realization for Malaysian Journal of Computer Science is at 92% and 95 % of the research article introductions in Pertanika journal accomplished this step. Similarly, the research articles with high citations and low citations also have this more as an obligatory move at 100% occurrence for both groups. The Computer Science research article introductions and the Computer Science subdisciplines research article introductions have the realization at 98% for both groups.

In brief, Recycling is deemed as an obligatory move in research article introductions for the research articles in this study. Following this step, CARS model suggest another step in Move 2 which is Step 2 "Establishing a niche: presenting positive justification".

4.2.2.4 Move 2 Step 2: Presenting positive justification

In this section, the findings for the move analysis and interview of Move 2 Step 2 *Establishing a niche: Presenting positive justification* are presented. Beginning with the general finding of the move analysis, this section then continues with the percentage of occurrence for Move 2 Step 2 according to the university groups, journal types, citation index, and subdisciplines. And then, the findings of the interview regarding this move are presented. Finally this

section describes the five identified techniques that have been used to realize Move 2 Step 2 in the research articles in the corpus

After asserting Move 1 and Move 2 iteratively, with each cycle leading to increasingly specific topic, the research territory and research niche is established and the research gap is contended. The model proposed that upon completion of these cycles or what is termed as Recycling, the next step is *Presenting positive justification*, also known as Move2 Step2. This strategy is where the research gap highlighted is being retained and claimed. Statement on the intention to occupy the research space is made. The excerpt below (USM1) illustrates on how Move 2 Step 2 is realized in one of the research articles in the corpus.

1 The contamination of digital image by salt-and-pepper noise is
2 largely caused by error in image acquisition and/or recording. For
3 example, faulty memory locations or impaired pixel sensors can
4 result in digital image being corrupted with salt-and-pepper noise
5 [1]. The need to remove salt-and-pepper noise is imperative before
6 subsequent image processing tasks such as edge detection or
7 segmentation is carried out. This is because the occurrence of salt-
8 and-pepper noise can severely damage the information or data
9 embedded in the original image.

(USM 1)

In the excerpt (USM1), the niche of the study is "Salt-and-Pepper Noise reduction" since the title of the research article is "Noise Adaptive Fuzzy Switching Median Filter for Salt-and-Pepper Noise reduction". The first sentence of the quotation (lines 1 to 2) fulfilled the strategy for Move 2 S1A *Indicating the research gap* by highlighting the problems related to "salt-and-pepper noise". Next in lines 2 to 5, the gap is asserted further by the use of the move on *Adding to what is known* using the example for the problem

highlighted. Move2 Step2 is realized in the second part of the quotation (lines 5 to 7) of "The need to remove salt-and-pepper noise is imperative before subsequent image processing tasks such as edge detection or segmentation is carried out" This sentence presents the need for a solution with regards to the problem highlighted. This need is further supported in lines 7 to 9 "This is because the occurrence of salt-and-pepper noise can severely damage the information or data embedded in the original image" The support for a solution and positive justification is by means of expressing the downside if the problem is not solved.

Among the four ways of realization proposed in Move 2 of Swales model (2004), Step 2 is the least strategy that has been used by the writers in this corpus. The overall occurrence percentage is at 62%. Even though this Step complied with the suggestion as an optional step in CARS model (Swales, 2004), the percentage of occurrence in this corpus is much lower than the other moves and steps that preceded this step.

Table 4.11 shows the percentages on the realization of Move 2 Step 2 according to the universities group. The highest percentage of occurrence is at 75% which is by the Private university group. Apex university and the Focus university group had the occurrences at 53 and 55% respectively, indicating that only half of the writers utilized this strategy. Both Comprehensive university and Research university groups scored slightly higher at 62%.

Table 4.8

Findings for Presenting positive justification

University Group	Percentages
Apex University	53%
Comprehensive University	62%
Research University	62%
Focus University	55%
Private University	75%
Total	62%

Similarly, the research articles with high and low citations also have this step as obligatory and realized it at 68% and 52% respectively. The research articles of Computer Science discipline and Computer Science subdisciplines have 62% and 50% realization for this step in that order. Analysis on the utilization according to the journal type shows that research article introductions in Malaysian Journal of Computer Science fulfilled this move at 78% whereas the Pertanika journal realized this move at 53%.

Interview findings indicated that the writers were aware of the strategy on justifying why the study was conducted. Interviewee S on answering to the question if she justified her study in the introduction section answered positively. **"Saya selalu saya akan justify sebab apa bila kita justify kita akan tahu aim at the end tu balik kepada justification kita, because daripada justification kita, kita dah ada objective la kan. Selalu kalau saya write article selalu basic punya introduction, the importance of the studies lah very few..very..very very apa ni.. short introduction to the subject"** < Usually I will justify because when we justify, we will know the aim which in

return goes back to our justification, because from the justification we already have the objective. Usually when I write article, often with basic introduction, the importance of the study ..very few.. very..very.. very (hesitant) short introduction to the subject> (lines 42-46). Interviewee S has narrated that in her writing, she justified why the research was important in the introduction section.

When asked how she knew that justification of the study is needed in the introduction section, she said **"Selalunya from courses"** <usually from the courses> (lines 57). Even though the writing courses she attended have emphasized on the need to reason out on why the study was conducted, she interpreted giving justification as giving the aims (Transcript S, line 43), the importance of the study (Transcript S, line 67) and the objective of the study (Transcript S, line 67). As she said **"bila kita justify kita akan tahu aim at the end tu balik kepada justification kita, because daripada justification kita , kita dah ada objective la kan. Selalu kalau saya write article selalu basic punya introduction, a..a..the importance of the studies lah"** <when we justify, we will know the aim which in return goes back to our justification, because from the justification we already have the objective. Usually when I write article, often with basic introduction, a..a..the importance of the study> (lines 42-46).

This is different from the suggestion in CARS model which suggests Move 2 Step2 *Establishing a niche: Presenting positive justification* is actually stating reason to why the research gaps need to be fulfilled. While stating the ground for a study in the area, the justification does not have the intended study in focus

instead; the focus should be solely on justifying the niche. This is because, mentioning about the study is in move3 which is *Presenting the present work.*

On the other hand, Interviewee A reasoned out that "it is important to justify the research as this will form the contribution to knowledge which is the most important of any research" (Transcript A, line 5-9). Interviewee A even relateed this justification to the global readership as he added "it will relate the impact of your research locally within the area of your field or globally among the community". Such perception is in line with the logics of Move 2 which is to establish the niche of the study by presenting a positive reason for the particular area of study to be investigated.

In short, the writers were aware of the strategy on presenting positive justification for the study. However, how the writers realized this strategy which are in various forms may not be accurate as suggested by CARS model (Swales, 2004).

In this corpus, Move 2 Step 2 *Presenting justification* is carried out in a few ways. Some research articles used more than one way to complete the Step. Analysis of the corpus showed that there were five ways on how Move 2 Step 2 was carried out in the research articles of this corpus. The 5 techniques identified are as follows.

1. Direct justification on the need for the study
2. Direct justification on the benefit of the study
3. Indirect justification by giving the drawbacks of not having the study.

4. Embedded with Move 3

5. By using a combination of practices

In the following sections, I will explain how these 5 ways in which Move2 Step2 which is *Establishing a niche: Presenting positive justification* were carried out by the writers.

Direct justification on the need for the study

In realizing Move2 Step2 which is *Establishing a niche: Presenting positive justification*, some of the writers gave direct justification on the need for the study. This conduct began after drawing attention to the research gap. After highlighting the need for the study in relation to the problem or limitation in the research gap, the justification on why the study was necessary was given. Direct stance on the particular research problem is clearly and straightforwardly conveyed. Two quotations below (IIUM 6) illustrate on how this practice is achieved.

> Many applications of WSN require secure communications [1], [2] as such types of networks are prone to different types of malicious attacks, such as impersonation, masquerading, interception for misleading because of the wireless connectivity, the absence of the physical protection, and the unattended deployment, etc. *Therefore, the security in sensor network is extremely important.*
>
> IIUM 6

The extract above (IIUM6) was taken from an article entitled "Securing Wireless Sensor Networks with An Efficient B+ Tree-Based Key Management Scheme". What can be seen from the extract, after establishing the niche, of the

study which is security in sensor network in lines 1 to 5 the step for *Presenting positive justification* was attempted by giving a direct justification on the need for the study in lines 5 to 6 as in "Therefore, the security in sensor network is extremely important". The need for the study was directly given, without offering any solution or further clarification. This direct stance conveyed in a short sentence has positioned the niche as "important" and "necessary" hence putting the niche in a positive position for research.

The quotation below (F7 UMP1) is another example on how direct justification on the need for the study is made.

> The conventional load shedding techniques may not work as desired in emergency conditions due to the complexity and size of modern power systems. Therefore, *alternative methods* are required for solving certain difficult power problems where the *conventional techniques have not achieved the desired speed and accuracy*.
>
> (F7 UMP1)

In this quotation, the problem was presented in lines 1 to 3 and then the justification on the need for "alternative methods" in line 3 was presented and justified further by reassertion on the research gap of "conventional techniques have not achieved the desired speed and accuracy" in lines 4 to 5. In this excerpt the problems of the study were presented twice, before and after the justification for the study thus necessitated the conduct of the study.

Move2 Step2 Establishing a niche: Presenting positive justification was also realized by giving giving direct justification on the benefit of the study which is explained in the following section.

By giving direct justification on the benefit of the study

In the corpus of the study, another way to present a positive justification on conducting the intended study is by giving direct justification on the benefits of the study. The advantage on addressing the research gap is presented and the benefit of the solution proposed is explained briefly. In this technique, the writer rationalized and substantiated the reason to address the research gap by indicating the value, the effectiveness or the convenience of performing the proposed solution.

1 These dynamics are usually represented as a class of *disturbances*
2 within the model [11] and could *corrupt the reconstruction*;
3 producing a nonzero reconstruction when there are no faults, or
4 worse, mask the effect of a fault. *Therefore,* ***schemes need to be***
5 ***designed*** *so that* ***the reconstruction is robust to disturbances***.

(IIUM8)

In the quotation above (IIUM8), the step for "Presenting positive justification" is completed in the last sentence from lines 4 to 5. The problem highlighted was the "disturbances" that "could corrupt the reconstruction". The last sentence in lines 4 to 5 stated that "schemes need to designed" (sic) and to justify the propose solution, the benefits of solving the problem was presented. The benefits given were "the reconstruction is robust to disturbances" in line 5. In this context, the benefits of the solution proposed justified the reason on why the intended study needed to be carried out.

The following quotation (UTM2), illustrate another way of fulfilling Move2 Step2 Establishing a niche: Presenting positive justification by giving direct justification on the benefit of the study. The writer stated that "cutting

conditions" of "machining cutting problems" were listed and supported with two citations in lines 1 to 5.

> Some established soft computing techniques applied by previous works to suggest the optimal *cutting conditions* for *machining cutting problems* are, for example, the genetic algorithm (GA), simulated annealing (SA), Tabu search (TS), ant colony optimization (ACO), and particle swarm optimization (PSO) *(Aggarwal & Singh, 2005; Mukherjee & Ray, 2006).* Considering the ability factors of GA for the machining optimization problem, *an effort is taken to estimate the best combination* of cutting conditions for the Ra performance measure in the end *milling machining process*.
>
> UTM2

The problem listed indicated the research gap and to claim this gap, the writer made a statement that claimed "an effort is taken to estimate the best combination" in lines 7 to 8, followed by the benefiting area which was "milling machining process." in line 9. The justification for the intended study was revealed by presenting the benefit of addressing the problems that had been listed. Writers were also found to give direct justification to their intended research by offering the solution in relation to the research gap revealed earlier. Unlike the solution in the Finding and Discussion section, the solution offered here is simple short and brief. Long elaboration on solution at this point has not been detected.

> Aedes mosquito rests inaccessible areas behind the human dwellings; hence, the collection of these mosquitoes by hand catch is very difficult. However, the adult mosquitoes are being collected by either man-biting/landing or netting. These methods are considered as *unethical issues* for measuring the adult population. Therefore, *attempts are being made* to collect these mosquitoes through *different types of traps* developed by different companies.
>
> IIUM 3

In the example above (IIUM3), the problem of "unethical issues" in relation to collection of samples was highlighted (line5). In the last sentence, the writer completed the step for *Presenting positive justification* in the statement that hinted "attempts are being made" to solve the problem using various "types of traps" (lines 6-8). The solutions to the problem highlighted in the research gap were offered and this prepared the ground for further claim to occupy the research gap hence justify the need for the intended study. Another way that writers in the corpus justified the need for the intended study is by giving indirect justification via giving the drawbacks of not having the study which is illustrated in the following section.

By giving indirect justification via giving the drawbacks of not having the study.

In realizing Move2 Step2 *Establishing a niche: Presenting positive justification,* some of the research articles writers in the corpus prefered to give indirect justification for the intended study. In this practice, the disadvantages or the down side if the research gap is not occupied was revealed. The following excerpt (F7 UMP1) is used to illustrate how this technique was accomplished.

1 Analysis of recent widespread outages demonstrates that *blackouts* rarely
2 happened and are usually caused by a sequence of low-probability disturbance
3 which is *generally not expected by system operators*. *If fast control actions*
4 *such as load shedding and generation rejection are not taken proactively, the*
5 *system may cascade and separate into unplanned islands (Miroslav et al., 2007).*

(F7 UMP1)

In the excerpt given (F7 UMP1), the problem highlighted was "black outs" which were "generally unexpected by system operators" (line 1-3). And then the writer warned that "If fast control actions such as load shedding and generation rejection are not taken proactively" (line 3 to 4) consequences would be detrimental. The danger of not taking the suggested measures was specified in "the system may cascade and separate into unplanned islands (Miroslav et al., 2007)" (lines 4-5) The writer not only hinted on the hazard but also supported the possible drawbacks with a citation. In this excerpt, the writer has fulfilled the move to *present positive justification* on having the study done by giving indirect justification which is by giving the drawbacks if the suggested measures were not done.

Another technique of *presenting positive justification* to conduct the study is by having the justification embedded with Move3. This technique is illustrated in the following section.

Embedded with Move 3

The analysis of the corpus found that realizing the step on *Presenting positive justification* on the intended research had also been accomplished by embedding the justification into Move 3 which is *Presenting the present work.* After presenting the research gap, limitation or the problem of the study, the "research space" (Swales, 1990: 142) created is claimed by announcing the intended research at the same time a justification on the intended study is made. The justification is made by linking the announcement of the present work with the

research space created. To illustrate the following excerpts (F19 UMT4 Pertanika2P3) is used to show how the step is embedded in Move3.

" In spite of their usefulness, *unfortunately only a little work has been done* on the incorporation of seaweed in formulated feeds of freshwater cultivable fishes. Therefore, an attempt has been made in **this study** to incorporate seaweed as one of the ingredients in pelleted feed and to evaluate the efficacy of the feeds"

(F19 UMT4 Pertanika2P3)

In the example (F19 UMT4 Pertanika2P3), the limited research in the niche area of "seaweed" and "fish feed" was highlighted in line 1 to 3. The research space created is claimed by announcing and justifying the intended study. The justification for the study was realized by embedding the justification in the announcement on the intended study which was actually Move 3 in the CARS model (Swales, 2004).

The following excerpt (IIUM2) provided another example on how this technique was done. The problems of the study were laid out three times. The first one was "the affective responses are not easily mapped into distinctive emotion responses" (line 3) which was followed by "there is no coherent notion on what are the basic emotions" and "some complex emotions are a combination of some basic emotions" (line 6-9).

Emotion studies generally employ classified affective responses of users using data labeling (sic) from questionnaires [1–3]. *However, the affective responses are not easily mapped into distinctive emotion responses*. Nevertheless, there are researches that mapped them to six basic emotions: happy, sad, fear, anger, surprise and disgust [2,4]. *However, there is no coherent notion on what are the basic emotions [5]. Furthermore, there are also views that some complex emotions are a combination of some basic emotions [4]*. Hence, five of the six

8 basic emotions, which exclude disgust, are studied in this work.

IIUM 2

The use of connector "Hence" on its own, functioned as a move even when it is just a single word. The word "hence" in this context represents the reasons that justified the intended study. This move on justification which functioned in the use of the word "Hence" was clustered with the announcement of the intended study which was represented in the phrase "are studies in this work". In this excerpt (IIUM 2) the justification for the study was made using by the embedding in Move 3. Apart from embedding the justification of the study in Move3, another technique of realizing the strategy on justifying the need for the intended study is by using a combination of all the techniques mentioned. The technique on the combination of practices is explained in the following section.

Combination of techniques

Four techniques used to realize Move2 Step2 *Establishing a niche: Presenting positive justification* (Swales, 2004) found in the analysis were explained in the previous sections. The techniques identified were Direct justification on the need of the study, Direct justification on the benefit of the study, Indirect justification by giving drawbacks of not having the study and finally Embedding the justification in Move 3.

However, in some cases Move 2 Step 2 *Presenting positive justification* was realized by using more than one technique mentioned. The combination technique which blended more than one technique was identified in the writings. The quotation bellow (P7 UMP1) uses two combinations of techniques which

are; by giving the direct justification on the need of the study and also by giving indirect justification via stating the disadvantages if the research gap is not occupied.

1 However, due to emotional and psychological stress, an operator may
2 not be able to adequately respond to critical conditions and make
3 correct decisions. *Mistakes can damage very expensive* power
4 equipment or *worse still lead to the major emergencies and*
5 *catastrophic situations*. Clearly, *there is a strong need for automated*
6 *corrective procedures* that can assist operators in vulnerability control.

(P7 UMP1)

In excerpt P7 UMP1, the problem was presented in line 1 to 3. An then, the justification of the study were made using the first technique which is by giving indirect justification via stating the drawbacks of not having the study as in "Mistakes can damage very expensive power equipment." (line 3) Here the drawbacks of not having the study were reinstated again by indicating the negative consequences if the problem in the research gap is not solved as in "or worse still lead to the major emergencies and catastrophic situations" (line 4).

After stating the drawbacks twice, the justification for the study is further asserted by using another technique which is by giving the direct justification on the need of the study as in "there is a strong need for automated corrective procedures". The justification of the study is again reasserted using another technique which is by giving direct justification on the benefit of the study as in "that can assist operators in vulnerability control". In this excerpt (P7 UMP1) has illustrated the how combination of techniques was used to realize Move2 Step2 *Establishing a niche by presenting positive justification.*

To sum up, this section has presented the percentage of occurrence according to the university group, journal types, citation index, and Computer Science subdisciplines. The findings for all the groups complied with the suggestion in CARS model on having this step as an optional step. 5 techniques on how this step was realized in this study were presented and they are: Direct justification on the need for the study, Direct justification on the benefit of the study. Indirect justification by giving the drawbacks of not having the study, Embedded in Move 3, and the last one By using a combination of techniques.

In the following section, the findings of Move 3 which is "Presenting the present work" (Swales., 2004: 120) is explained. Similar to Move 2, Move 3 also has a few steps. The finding on the move analysis revealed that each of the steps was realized using a few different techniques. Each technique are explained and illustrated using the excerpts from the corpus. The findings of the interview on Move 3 were also brought together in describing Move 3 used in this corpus.

4.2.3 Move 3: Presenting the present work

This section begins with the general findings on Move 3 that illustrate the importance of Move 3, the percentage of occurrence according to the university groups and journal type. And then, the subsections present the findings of the study on Move 3 according to the 7 steps in CARS model (Swales, 2004). For each steps, the percentage of occurrence are given, followed by the explanations on the identified techniques and illustrations of how the techniques were used by the writers to fulfil Move 3.

General findings of Move 3

In CARS models, Move 3 is about "Presenting the present work". Realization of Move 3 in CARS (Swales, 2004) model has one obligatory step, three optional steps and three other steps which are probable in some fields, but unlikely in others. Missing Move 3 denies the writer from presenting the present work in the introduction section of the research articles which is supposed to engage and to appeal to the readers; capture their interest for further reading. Such cut off may give an advantage of the other writer who chooses to make the move as the appeals can engage the readers in the earlier stage of reading the research article. To illustrate the point further, a quote from a research article that have Move 3 in the research article introductions(C9 IIUM8) is compared to the quote from a research article that do not have Move 3 (UTM4)

1 Ng et al. [8,9] built on the work of [6] and analyzed the conditions
2 that guarantee DDFR using the sliding mode observer [3]. It was also
3 found in [8,9] that the sliding mode observer can achieve DDFR with
4 weaker conditions compared with the linear observer. *This paper*
5 further builds on the work in [8,9] by using two sliding mode
6 observers in cascade, where measurable signals from the first observer
7 are found to be the output of a fictitious system that is driven by the
8 faults and disturbance, and fed into a second sliding mode observer.

C9 IIUM8

In the quote above (C9 IIUM8) , the writer has completed Move 2 which is on establishing the research niche in line 1 to line 4 and then proceeded to realize Move 3 which is presenting the research work. The realization of move 3 begins in the word "This paper" (line 4). The following sentences illustrated how the writers manage to link the present research with the previous idea as in "This paper further builds on the work in [8,9]" (line4-5).

This rhetorical structure naturally steers the readers' mind from discovering the importance of the niche to realizing how the current research intends to contribute to the research development in the niche area. This rhetorical strategy generates such flow of ideas however such flow would not be accomplished if Move 3 is missing. Unlike research article C9 IIUM8, UTM4 below provides an example of a missing Move 3.

1 Down syndrome in the issues of cognitive or developmental delay [5].
2 However, research has shown that educational and therapeutic
3 interventions such as early intervention services can greatly benefit
4 learners with Down syndrome. In the other words, supports and early
5 planning are often necessary to facilitate employment and community
6 life. Although some of the limitations of Down syndrome cannot be
7 overcome, early intervention program is proven to be able to improve
8 quality of their lives [6].

(UTM4)

The extract above (UTM4) indicates that the research space has been successfully created but it is not claimed. The research space that explained the need for a study in this niche has been effectively formed in lines 1 to 8 however; the writer ended the introduction section as it is and proceeded to the next section of "Literature review" section. The writing has put off the announcement on what the present research is about. The purpose and the description of the current research were also not given. As a consequence of skipping these steps, the association between the research space established and the intended research is ambiguous. Skipping this obligatory steps leaves the readers with uncertainty on what the research article is actually about and what gap is the research article trying to fulfil. This excerpt (UTM 4) has skipped Move 3 and for this reason, the rhetorical structure that naturally steers the

readers' mind from discovering the importance of the niche to realizing how the current research intends to contribute to the research development in the niche area was not achieved.

In this study, a small number of research article missed Move 3. Table 4.12 shows the percentage of Move 3 realization according to the university group. From Table 4.12, 91% of the research articles in the study have realized Move 3 using any one of the seven steps. Only 14 research articles (9.3%) did not announce the present research in the introduction paragraph.

Table 4.9

Findings on Move 3 by university groups

University Group	Count for presenting the present work	Percentages
Apex University	16	94%
Comprehensive University	15	94%
Research University	68	88%
Focus University	20	100%
Private University	17	85%
Total overall	136	91%

The 14 research articles which did not make use of this strategy owed the avoidance to a few reasons. The first reason was due to the nature of the research article which is non experimental and more of being conceptual or review. It was found that conceptual or review articles in this corpus avoided presenting the intended study. The descriptions or purposes of the research article were also vague. Swales (2004:232) has emphasized that " in appropriate circumstances, early positive evaluations, early justifications and early clarifications can work to both impress and reassure the reader that the paper is

worth pursuing further". It is understandable that the principle outcomes and the methods are not mentioned, but the absence on the value of the present writing and the lack of description on the intended writing in the introduction results in ambiguity on what to expect.

The second reason is related to the findings in the Macro structure analysis which has shown that many of the articles have extensive write up between the Introduction section and the Methodology section. It was found that the presentations of the current work were written the other sections in between Introduction and Methodology sections. Closer examination showed that is true for many of the articles especially the articles from Pertanika Science and Technology Journal. When the analysis was done according to the journal names, the pattern attributed to the journal style was obvious. All of the research articles in the other journal, Malaysian Journal of Computer Science have used this strategy. The summary of the finding is in table 4.13.

Table 4.10

Findings on Move 3 by journal types

Journal Name	Count for Move 3 Presenting the present work	Percentage of Move 3 Presenting the present work
Pertanika Science and Technology (N=38)	30	79%
Malaysian Journal of Computer Science (N=14)	14	100%

The data in table 4.13 shows that while 100 percent of research articles in the Malaysian Journal of Computer Science accomplished this move, only 79% of

the research articles in the Pertanika Science and Technology Journal realized Move 3. Using the scale of 90% explained in Table 4.13 Scale for the practice and move occurrence, Move3 is deemed as optional by Pertanika journal but obligatory in the other journals. This finding suggests that apart from type of research article, the journal style is also a factor that influences the choice of moves and steps.

The link between the low percentage and the journal where the research articles are being published shows that, the journal guidelines prescribed to the authors, do play an important role on the rhetorical strategy in a research article. The journal may impose a certain structure and preference that may be unique to the journal only. As a result, the research articles that appear in the particular journal have similar structure and style. In relation to the findings of this study, Pertanika Science and Technology Journal has prescribed a preferred format hence the missing move 3 is more prevalent amongst the research articles in this journal.

CARS model (Swales, 2004) posits 7 steps that can be used to realize Move 3. The overall percentages for the 7 steps are given in table 4.14. The data in the table suggests that some of the steps are preferred by the writers such as Step M3S1. Overall, all of the steps in Move3 are at Optional level. The detail explanation on each step is illustrated in the following sub sections.

Table 4.11

Findings on Move 3 and the 7 Steps

ID	M3	M3S1	M3S2	M3S3	M3S4	M3S5	M3S6	M3S7
Private	85	80	0	55	15	15	35	50
Focus	100	100	0	15	65	20	30	25
Apex	94	94	0	18	59	18	35	30
Compre -hensive	94	88	6	6	62	0	19	56
RU	88	82	0	16	45	14	39	28
Total %	91	86	1	17	53	15	35	34

Move 3 : Presenting the present work
Step 1: Announcing present research descriptively and/or purposively
Step 2: Presnting research questions or hypotheses
Step 3: Defnitional clarification
Step 4: Summarizing methods
Step 5: Announcuing principle outcomes
Step 6: Stating the value of present research
Step 7: Outlining the structure of the paper

The next section is on the first step of Move 3 which is *Announcing the present research*

4.2.3.1. Move 3 Step 1: Announcing present research

In this section, the findings on Move 3 Step 1: Announcing present research is presented. The findings are presented beginning with the overall percentage on occurrence of this Step according to the university group, followed by the percentage of occurrence according to journal types, citations and subdisiplines. And then, the findings on the four techniques used in the corpus to realized this step is presented.

Step 1 in Move 3 is the obligatory step which is "Announcing the present research descriptively and/ or purposively" (Swales, 2004). This is an obligatory step and can be realized in two ways: Purposively which is by stating the purpose and reasons on why the study is done, and/or descriptively which is by describing, listing, recounting the composition of the study.

The following table (Table 4.15) shows the percentage of realization for the step on "Announcing the present research" according to the university group. The details on the step realization according to the university group are tabulated in Table 4.12

Table 4.12

Findings on percentage of M3S1 by the university group.

University Group	Count for presenting the present research descriptively or purposively	Percentages for presenting the present research descriptively or purposively
Apex University	16	94%
Comprehensive University	14	88%
Research University	63	82%
Focus University	20	100%
Private University	16	80%
Total overall	129	86%

. This study found that overall; 86 percent of the research articles realized this step. All of the universities have this step as an optional step. Whereas, CARS model (Swales, 2004: 125) posits that this step should be an obligatory step in the research article introduction. Therefore, the percentage of 86% is below par. This is discussed further in chapter 5.

The following table 4.13 shows the findings of the percentages derived from different analysis of this corpus. The percentage of the occurrence is tabulated according to the subdisciplines and citation.

Table 4.13

Findings for M3S1 by subdisiplines and citation

Analysis of corpus	Percentages	Move
Overall	86%	Move3S1- Announcing present research
Highly cited	97%	Move3S1- Announcing present research
Zero citation	75%	Move3S1- Announcing present research
Computer Science discipline	100%	Move3S1- Announcing present research
Subdisciplines	72%	Move3S1- Announcing present research

The percentage for the overall corpus is 86% which is below par. The analysis of the findings between highly cited and zero cited articles indicated that the step was more frequently utilized by the highly cited group compared to the group of research articles with zero citation. The groups of research articles with high citation realized this step at 97 percent while the research articles with lower citation have a lower percentage of realization at 75 %.

The high percentage of occurrence amongst the highly cited research articles indicates that M3S1 *Presenting the present work via Announcing present research* (Swales, 2004:232) is being practiced in highly cited articles in this corpus. The percentage shows that the highly cited articles complied with the CARS model (Swales 1990; 2004) on having this step as obligatory. Swales (2004:232) asserted that "...in appropriate circumstances, early positive evaluations, early justifications, and early clarifications can work to both

impress and reassure the reader that the paper is worth pursuing further". *Announcing the present research* is found to be less readily available in the research articles with zero citation as such; pedagogic implication can be drawn.

Analysis of the corpus using the expert view indicates that the research articles identified as within Computer Science discipline have higher realization compared to research articles that were singled out as subdisciplines. All of the research articles identified to be within the Computer Science discipline accomplished this step whereas, only 72 percent of the research articles that were categorized to be in the sub discipline made use of this move. The 100 percent occurrence amongst the Computer Science discipline indicates that the Computer Science writers in this corpus have been using this strategy whereas the Computer Science subdisciplines writers use this step only as an option and not as an obligatory strategy. Analysing the finding for this step according to the journal types reasserts the suggestion that the journal type influences the rhetorical choices used in the writings. The analysis is tabulated in table 4.17.

Table 4.14

Findings on M3S1 by the journal type

Journal Name	Count for Move 3 Step 1 presenting the present research descriptively or purposively	Percentage of Move 3 Step 1 presenting the present research descriptively or purposively
Pertanika Science and Technology (N=38)	29	76%
Malaysian Journal of Computer Science (N=14)	14	100%

It can be concluded that the research articles in the Pertanika Science and Technology journal have a lower realization at 76% occurrence for this step compared to the research articles in Malaysian Journal of Computer Science at 100% occurrence rate. The reason could be due to the prescribed writing styles by the journals.

The finding from the interviews indicated that this strategy is highly preferred by the writers. All writers agreed that the intended research must be presented in the introduction section. Interviewee K said **"kita nak focus paper kita ni pada apa, so normaly kat intro tu.. saya cerita jugalah sikit"** <what are we focusing our paer on, so in the intro.. I usually give some information> (line58-59). Interviewee A conveyed that "Introduction should be a brief introduction of your research" (line 10). In short, in line with the finding of the move analysis, the interviewees presented the intended research work in the introduction section.

As mentioned earlier in this section; CARS model suggested that the announcement on the present research can be done in two ways, descriptively and/or purposively. The findings of this study suggested that apart from the two ways suggested by CARS model (Swales, 2004), the writers of the research articles in this corpus also used two more techniques which are Stating the objective or aim of the research and Embedded with the other steps in Move 3. The techniques to realize Move 3 Step 1 *Presenting the present work: Announcing present work* found in this study are as the following

1. Purposively – by stating the purpose and reasons on why the study is done.

2. Descriptively - by describing, listing, recounting the composition of the study.

3. Stating the objective or aim of the research.

4. Embedded with the other steps in Move 3.

The following subsections describe how the techniques were carried out to fulfil Move3 Step 1 *Presenting the present work: Announcing present work.*

Purposively – by stating the purpose and reasons on why the study is done

This section explains how Move 3 Step 1 *Presenting the present work: Announcing present work* purposively is realized in the corpus of the study. In this technique, the purpose of the intended research is stated briefly. In the following extract (F4UTHM4) three purposes can be identified which are; to overcome the situation (in research gap mentioned earlier), to computerize the system and to evaluate in more consistent and precise way. These purposes support the announcement of the intended research in such way; the intended research is placed in a worthy position.

> To overcome such situation, Student Evaluation System is build to computerize the current system and helps to evaluate in more consistent and precise way.
>
> (F4UTHM4)

> Light turned on continuously and it lead to energy waste. Thus this research is carried out to provide a mechanism through the development of a prototype to provide a service to the home owner to optimize the usage of electricity through remote control using SMS services.
>
> (F3 UTHM3)

The next excerpt (F3 UTHM3) also illustrates the techniques of stating the purpose and reasons for the study in announcing the intended study. Again three reasons were listed out which are "to provide a mechanism through the development of a prototype", "to provide a service to the home owner" and "to optimize the usage of electricity through remote control using SMS services". By giving the reasons in announcing the intended study, the purpose of the writing is clearer and more assertively stated. The next technique to realize Move3 Step 1 *Presenting the present work: Announcing present work* is by stating the study descriptively and this is explained in the next section.

Descriptively - by describing, listing, recounting the composition of the study

The second way of realizing Move3 Step 1 *Presenting the present work: Announcing present work* is by describing, listing or recounting the composition of the study. In the extracts below (P7 MMU7, P13UNITEN1), in announcing the intended study, the writers used a simple description on the work done. In the first extract (P7 MMU7), the description of the present research was given as "explains the method used to do node positioning in the ZigBee network".

> Wireless Sensor Networks, particularly the ZigBee devices offer a more viable positioning method that uses existing infrastructure without escalating the operational expenses. This paper explains the method used to do node positioning in the ZigBee network.
>
> (P7 MMU7)

The second extract (P13UNITEN1) described that the present study is proposing "a new configuration of fuzzy controller" which is described further as "directly

produces a two-level bang- bang crisp output". These descriptions gave the readers an idea on what the research articles is about.

> The advantage of SDRE is its efficiency in converging to a solution and is a primary source of spacecraft tracking control systems [7]. In this paper a new configuration of fuzzy controller is proposed. This controller directly produces a two-level bang- bang crisp output.
>
> (P13 UNITEN 1)

The following section describes how Move3 Step 1 *Presenting the present work: Announcing present work* is realized using the third technique which is by *Stating the objective or aim of the research*

Stating the objective or aim of the research

Apart from describing, some writers stated the objective of the research to announce the present research. The study found 19 of the research articles made use of the research objectives or research aims to present the research. The following extracts (USM2, F16 UPNM1) illustrate the use of objectives and aims that promote Move 3

> The aim of this paper is first to obtain the ideal solution by solving a single fuzzy linear programming problem. Second, we develop a weighting method using optimization technique to find the best weights for selecting the most favorable (sic) alternative.
>
> (USM2)

> The main objective of this paper is to describe the component of a field blast test and instruments used by researchers worldwide and also to investigate the behaviour (sic) of hybrid

steel fiber concrete (HSFRC) subjected to air blast loading using high speed data acquisition system.

(F16 UPNM 1)

In both extracts (USM2, F16UPNM1), the use of "aim of the paper" and "objective of this paper" were given to announce the present research. In this technique, the word "aim" and "objectives" were used making the move easily identified. The next section explains how Move3 Step 1 *Presenting the present work: Announcing present work* is realized using the last technique which is by embedding the move with the other steps in move 3.

Embedded with the other steps in Move 3

The corpus showed that the step for *announcing present research* can also be accomplished by embedding the announcement with any of the steps in Move 3. In this technique, the announcement of the present research was done by blending the announcement with the other steps of Move 3. The following extract (P16 UTAR2) showed how the announcement of the intended research is made by linking it to Step 6 which is "*Stating the value of the present research*". The research space which was capped by "Without further enhancement, however, the CTM cannot be applied directly for the ramp metering operations" (lines 3-4) was claimed by the announcement on the intended research. This announcement is linked up with the value of the research which is "contributes ...a set of new formulae" (lines 6-7).

1 The CTM well characterizes dynamic traffic flow conditions because it is
2 able to capture the horizontal queue, shock wave and first-in-and-first-out
3 (FIFO) condition. *Without further enhancement, however, the CTM cannot*
4 *be applied directly for the ramp metering operations.* This paper therefore

5 contributes a modified celltransmission model (MCTM) with the ramp
6 metering rate, in which *a set of new formulae to calculate dynamic traffic*
7 *flow on a pair of merging links is derived*.

(P16 UTAR2)

1 In this research work, an intelligent load shedding scheme is
2 proposed using neuro-fuzzy controller as a means for vulnerability
3 control of large scaled interconnected power systems.

(F7 UMP1)

The second extract (F7 UMP1) the writer shows how announcement of the present paper can be embedded with Move 3 Step 4: *Summarizing methods*. In this example, the present research work is announced as "an intelligent load shedding scheme" (line 1). This brief announcement was followed by a brief explanation on the method used "using neuro-fuzzy controller" (line 2). The reason as to why such method is used is also briefly given "as a means for vulnerability control of large scaled interconnected power systems" (line 3). Apart from giving the reasons and describing, the announcement of the present research can also be realized by embedding the announcement with the other steps in Move 3. Because this practice is different from the previous practices which focused more on the purpose and description; the present study identified this practice as an alternative means to realize the step.

In short, with regards to the step of announcing the present research; the Computer Science academicians in Malaysian universities are utilizing the strategy however; the accomplishment of this step in the corpus is still low compared to the realizations in Computer Science research article studied at global scale. Thus suggests that apart from discipline variation, cultural variation

also may influence the way research articles are written. The findings also confirmed that journal selection influences the way rhetorical structure is realized in the research articles. It was also found that the highly cited research article accomplished this step more frequently compared to the research articles that have never been cited. On top of that, the analysis indicates that the Computer Science research article introduction have this move as an obligatory move while the Computer Science subdisciplines have this step as an optional step. The final finding of Move 3 Step 1 *Presenting the present work by announcing present research* (Swales, 2004: 232) proposed two additional ways of realizing this step which are using the research objectives and by embedding the announcement into the other steps in Move 3.

The next section describes the findings for Move3 Step 2 *Presenting the research work by presenting research questions or hypothesis* (Swales, 2004: 232).

4.2.3.2 Move 3 Step 2: Presenting Research questions or hypotheses

In this section, Move 3 Step 2 *Presenting the present research: Presenting Research questions or hypotheses* is explained. And then, the percentage of occurrence for Move 3 Step 2 according to university groups, and citation are presented. Next the findings of the interview on this step are given.

CARS model (Swales 2004) suggested another step for Move 3. *Stating the research questions or hypothesis* has been proposed as an optional step for the move of *Presenting the present research*. Apart from being optional, this step is

also less fixed in its order of occurrence as such, this step can appear before or after any other steps in Move 3. However, this study found that this step is the least preferred step amongst the writers of the research articles in the corpus. The percentage is the lowest amongst all the realizations. Only one article attempted this step. The following excerpt (C8 IIUM7) illustrates the practice.

> In search for current and future skill sets required for these ITO vertical sectors, we aim to investigate in Malaysia context the following research question:
>
> R1: What are the skill sets of IT graduates required by the ITO industry in the different vertical sectors?
>
> (C8IIUM7)

In the given quotation, the employment of the step is evident in the research question which has been stated clearly. In this study, C8IIUM7 is the only article that resorts to this step, however, the Computer Science experts suggested that this article is multidisciplinary and does not fall under the Computer Science discipline. Therefore, it can be concluded that Computer Science research article in this corpus do not draw on this strategy to present the research work.

While the utilization of research questions and hypothesis is low amongst the Malaysian writers, the use of objectives and aims is slightly higher indicating that instead of stating the research questions, the writers prefer to present the objectives and aims of the study. As mentioned earlier 13 % of the research article drew on the objectives and aims of the paper to accomplish the step of announcement of the present research. In short, the writers preferred to state the

aims of the study compared to giving the hypothesis or research questions. In the study by Shehzad (2012) based on the low realization, this step is incorporated with the earlier step. However, in this study, at zero occurrences, this step is ruled out and is considered redundant for the corpus.

The interview findings presented a mixed perception on whether research questions and hypothesis needed to be mentioned in the introduction section or not. Interviewee S felt that it is necessary to write the research questions in the introduction section as the research question would justify the research objectives. When asked if the research question is written in the introduction question, Interviewee S asserts that **"Research question aa.. yes.. masuk masuk jugak"** <Research question aa.. yes.. included included too" (line 83). Interviewee K also said she write the research questions in the abstract and briefly in the introduction section. Answering to whether the research questions were written in the research articles she wrote, Interviewee K elaborated **"a..ada. selalu saya dalam ..dalam abstract tu dah ceritakan secara ringkas, dalam into tu sometime kita nak galakkan orang baca seterusnya jadi orang nak tahu apa research question kita.. kita nak focus paper kita ni pada apa, so normaly kat intro tu.. saya cerita jugalah sikit"** < yes.. usually in the abstract it is explained briefly, in the introduction, sometimes when we want to encourage the readers to read further, to inform readers what our research questions are, what we intend to focus on, normaly I wrote it briefly in the introduction too> (line 51-52). On the other hand, the interviewees who are more experienced writers perceived differently.

On the other hand, Interviewee A gives an outright "No" (line 10) to the question whether he presented the research question in the research article introductions. The reason given is that the introductions section has to be brief. He justified that "Introduction should be a brief introduction of your research(sic), critical question should be covered after you have covered literature review, as this would be the part where you can criticize and rationalise the purpose of the research" (lines 10-13).

Similarly, Interviewee N who is also an experience writer, feels that for journal articles, research question should be put in the introduction section. Instead, suggested that the research questions should be converted into problem statements.

> **"selalunya research question dia tak** specifically **kita cakap** research question**. .betul tak? . kita bercakap tentang** research article journal **kan..?** journal **kan..?** Research question **tu usually kita** use **untuk** thesis **kan? So.. dalam** journal **atau** conference **kita tak particularly state kita punya** research question**. Kita convert je jadikan** problem statement**."**
> <usually the research question, we don't specifically mention it as research question, right? We are talking about research areticle journal right? Journal, right? Research question usually we use it for thesis right? So in the journal or conference, we don't particularly state our research question. We convert it to problem statement"> (Interviewee N lines 57-61).

In short, the findings from the text analysis showed that only one of the research articles used this strategy. However, the interview revealed a mixed perception on whether research questions should be written in the introduction section or not. Interviewee S and K who were novice writer feels that it is necessary to

include the research questions in the introduction questions while the expert writers, Interviewee A and N asserted opposite view.

In the next section, we will examine the definitional clarification in Move 3.

4.2.3.3 Move 3 Step 3: Definitional clarifications

In this section, the findings for the move analysis and interview of Move 3 Step 3 *Presenting the present work: Definitional clarifications* are presented. Beginning with the general finding of the move analysis, this section then continues with the percentage of occurrence for this step according to the university group. And then, the findings of the interview regarding this move are presented. Finally this section describes the two identified techniques that have been used to realize Move 3 Step 3 in the research articles in the corpus

Move 3 on *Presenting the present research* can also be accomplished by giving the definitional clarifications on some of the methods terms, techniques, model, or concept used (Shehzad, 2012). The definition can be in form of classification, description, explanation or characterization on the item being defined. The purpose is to give a clear and regularize meaning to the item in context. The excerpt (P2MMU2) below illustrates how this step is achieved in one of the research articles.

1	Random Forest, by Breiman [17] is a
2	straightforward modification of bagging
3	algorithm [18], which aims to increase the
4	effectiveness of diversity within the classifier
5	ensemble to enhance its prediction performance.

6 The Random Forest uses bootstrap samples of
7 training dataset to train a group of decision trees
8 as in bagging, except, it randomly selects a
9 subset of features instead of using the whole set
10 of feature vector to train each decision tree.

(P2MMU2)

In the excerpt (P2MMU2), "Random Forest" is being defined and characterized as "modification of... algorithm" (lines1-2). The purpose, description and explanation given, form a reasonably clear and regularize meaning of "Random Forest" in the context of the study. Table 4.15 shows the percentage of realization for this move according to the university group.

Table 4. 15

Findings for M3 Step 3 percentage by the university groups.

University Group	Percentages for presenting the present research work via definitional clarification
Apex University	18%
Comprehensive University	6%
Research University	16%
Focus University	15%
Private University	55%
Total overall	17%

The finding shows that only 17 percent of the research article realized this step indicating that only a minority of the writers prefered this step. The private university group has the highest rate of occurrence at 55% and the lowest percentage is by the Comprehensive university group at 6%. The other university groups have the rate of occurrence ranging from 18 to 15%

Based on the findings in Table 4.15, this step which is on definitional clarification is considered as not required for the corpus of this study. This

finding concurred with the study by Shehzad (2012, p.34) that excluded the step on giving definitional clarification from her model for Computer Science research article. The low occurrences are mostly because this step was not utilized independently "instead they are embedded with" the other steps such as Establishing the territory and Announcing the present research. Given the small percentage from this finding and the finding from the other study on the global Computer Science corpus, it can be concluded that this step can be eliminated from the pattern for this corpus.

The analysis in the table also showed that, the private universities are more vigorous in using this strategy at 55% realization; compared to the writers from the public universities which realization ranges from 21% to 6% only. The definitional clarifications are given as the terms used and perceived as quite common in the Computer Science discipline. Given the rapid and growing publication in Computer Science discipline and the prevalent multidisciplinary research amongst the public university group this study suggests that the definitional clarification should be included in the pedagogic suggestion especially for public university groups.

Similarly, the findings on the comparison between Computer Science and Computer Science subdisciplines showed that both groups also have low preference for this step at 18% occurrences. The equal rate of realization signifies that this step is utilized and valued at the same par in the Computer Science and the Computer Science subdisciplines of this study. Analysis according to the journal type found that the research article introduction in

Malaysian Journal of Computer Science realized this move at 18% and 14% of the research article introduction in the Pertanika journal fulfilled this step. The highly cited research articles also used this step at a similar rate which is at 18% and the research articles with low citation realized this step at a slightly higher rate of 20%.

The interview findings indicated that the writers prefered to give definitional clarifications in the research article introductions. Interviewee N reported that she only write a "certain" terms in the introduction section but the engineering terms was written in the methodology or the proposed solution section.

> **Macam mana yang terms term tu ek? (ya..) yang definition ke apa ke ? (A ha..)A.. ada jugak ada certain yang say tulis dalam introduction ada yang .. banyak terms yang engineering terms tu saya tuliskan dalam methodology la yang propose solution punya part**.
> <How are the terms huh? (yes) Those in the definition or which? (A.. yes..) A.. there are some of it that I wrote in the introduction. Most of the engineering terms I wrote them in the methodology at the propose solution part>
> (Transcript N, line 68-70)

The reason given was that the introduction section is the part where the readers read "first" and some of the readers do not have the knowledge in the area. Therefore, it is necessary to be slightly "general" and "not too technical". She also felt that one or two important terms need to be define but matters concerning how the terms work must be put in the methodology section

> **Sebab dalam introduction tu sebab first orang akan baca paper kita.. orang tak de knowledge pasal kita punya area kan background of study kita so kita kena generalize kan dia tak boleh macam too technical kan? So kita define term term yang**

macam a... important la one or two term yang ..yang memang perlu untuk dia orang tahu tapi yang macam operation ke how to work tu semua tu kena letak dalam ee methodology, kita tak boleh letak dalam introduction.

<because the introduction is the first part of our paper that people read. People with no knowledge about our area, background of our study so we need to generalize it (introduction) to be not too technical, right? So we do define some terms which are necessary for them to know. But those on operation or how to work, we put them in the methodology , we should not put them in the introduction>

(Transcript N, Interviewee 74-77).

Interviewee A on the other hand felt that "it is good to provide clarification for unusual terms in the introduction section" The reason given was that the introduction is "where the readers can be aware of any unusual terms" (Transcript A, Line 14-17). Both Interviewee S and K also agreed that definitional clarifications should be written in the introduction section Interviewee S said **"**the definit**ion dalam** introduction **lah (**Definition **dalam intro ee?) Aaa. Ha..**< the definition in the introduction (Definition in the intro?) Aa.. yes> lines 63-67. Interviewee K justified that the definitional clarification is needed especially for the terms with ancronyms.

kalau la kita guna nak guna dia punya abbriaviation (mm) kalau macam kat intro tu kita bagi guna kita akan.akan elaboratekan abbreviation tu (mhhm) jd bila the next paragraph nanti next kan bila nak mention benda tu kita tak payah letak nama penuh tu, kita guna abbreviation dia

< If we want to use the abbreviation, in the intro we can use, we can elaborate the abbreviation so the next paragraph , the next time to mention it again, we don't have to use the full term, just use the abbreviation>

Transcript K line 89-91).

Next, the findings on the techniques used by the writers of the research articles in this corpus to realize this move is described in the following subsections. The techniques to realize the definitional clarifications can be classified into two; by giving reference and by giving a regularized meaning to the term. Both practices are illustrated using the following excerpts in the next subsections.

Definitional clarification by reference

The two quotations below illustrate how definitional clarifications are realized by using a reference. Instead of conjuring with the definition, the definitions are taken from the other sources such as the authors' previous studies, other works of similar research and the related authorities.

1 Navigation and localization are essential components in mobile robots. The
2 term localization in robots refers to the ability of determining accurate
3 positions in the search space according to the environmental perceptions
4 gathered by sensors [23]. (P3MMU3)

1 Previous literatures provide numerous definitions for the term
2 *explosion. National Fire Protection Associations (NFPA, 2008)*
3 defines an explosion as "The sudden conversion of potential energy
4 chemical or mechanical into kinetic energy with the production and
5 release of gas under pressure. (F16 UPNM1)

Both excerpts (P3MMU3, F16UPNM1) above gave the definitions by using references as supports. The first excerpts (P3MMU3) gave the definitional clarification by citing the previous work (lines 2-3). The second excerpt on the other hand, gave the definitional clarification of "explosion" according to the related authority which is the "National Fire Protection Associations" (line 3).

Definitional clarifications by giving a regularized meaning to the term

Another way of giving definitional clarification is by giving a regularized meaning to the term. The term may have different connotation and interpretation in general circumstances so in view of that, in the research article, the term is given a definite clarification as such the meaning is regularized throughout the research article. The following quotations demonstrate the practice in context.

> "...we propose a non-cooperative price game (NPrG) to govern the users in choosing the correct price coefficients. We show that the *NPrG resembles a Prisoner's Dilemma (PD) game [9]* where users who play this game selfishly and *iteratively in a way similar to the Iterated Prisoner's Dilemma (IPD) game [10]* will sustain a cooperative outcome and achieves a higher payoff".
>
> (P4MMU4)

Superficially in the above extract (P4MMU4), the definitions may appear to be in the full name of the acronyms given; however the discussion with the interrater concludes that the definitional clarification is actually comprised in the whole sentence. The acronyms given are "non-cooperative price game (NPrG)" (line 1), "Prisoner's Dilemma (PD) game" and "Iterated Prisoner's Dilemma (IPD) game"(line 5). The whole sentence is considered as the definitional clarifications because the sentence gives the characterization to each game according to how the game is represented in the study. "(NPrG)" is positioned as "to govern the users in choosing the correct price coefficients" in contrast to the existing "Prisoner's Dilemma (PD) game" which is represented as a game with "users who play this game selfishly and iteratively" and the "Iterated Prisoner's

Dilemma (IPD) game" as a game that "...sustain a cooperative outcome and achieves a higher payoff". The explanations defined the acronyms more than just giving the full name but also described the term. The description regularized the terms according to how the terms are intended to be used in the rest of the article.

The following excerpts ((P10 MMU10 UM17 MJCS)), illustrate another way on how the definitional clarification is accomplished by giving a regularized meaning to the term. The regularized meaning is given for the specific use in the study.

> "In this work, a term good learners is used to represent the best students. We define good learners as students who scored more than 80% in a post-test conducted in this research experiment. Also note that the terms learning materials, items, and documents are used interchangeably throughout this work."
>
> (P10 MMU10 UM17 MJCS)

The definitional clarifications in the quotations stated clearly that "students who scored more than 80% in a post-test" are the "good learners" (line 3). Without this clarification, the a few interpretations can be made on the term of the "good learners". The interpretations may vary and can be of a different meaning altogether so regularizing the meaning of this term is necessary. It is also stated that "learning materials, items, and documents" are used interchangeably. Such clarification is necessary to rule out confusion over specificities.

In short, the findings for this section suggests that the strategy to use *definitional clarification* in presenting the research work is non obligatory for the corpus but should be incorporated into the pedagogic practice especially for the public

universities writers. The analysis of the findings also found two prevalent practices in giving *definitional clarifications* which are by giving reference and by giving a regularized meaning to the term throughout the research article.

The following section describes the findings of the next step in Move 3 which is "Summarizing methods".

4.2.3.4 Move 3 Step 4: Summarizing methods

In this section, Move 3 Step 4 *Presenting the present research: Summarizing methods* is explained. And then, the percentage of occurrence for Move 3 Step 4 according to university groups, journal type, subdisciplines and citation are presented. Next, the interview findings are given followed by explanations on the identified techniques which are techniques on how *Summarizing methods* is realized in this corpus is explained.

Another step for Move 3 *Presenting the present* work is Step 4 *Summarizing methods* which is proposed as optional and less fixed in order (Swales, 2004: 232). This section describes the micro analysis findings and the interview findings of this Step. The description begins with the percentage of occurrences for this Step by the university group followed by the comparison of the percentage between the Computer Science discipline and the subdisciplines. And then the interview question is presented. Finally the identified techniques used by the writers to realize this move are described.

Swales (2004: 231) proposed that "summarization of methods used "is necessary for research articles that highlight "methodological innovations,

extended definitional discussion of key terms...". Table 4.16 shows the percentage on the use of the step on *summarizing methods* by university groups. In table 4.16, comparing the percentages accomplished by each of the university groups shows that the use of this step is obligatory amongst the Focus university group and the Comprehensive university group while being optional to the other groups.

Table 4.16

Findings on percentage of realization for M3S4

University Group	Percentages for presenting the present research work via Summarizing methods
Apex University	59%
Comprehensive University	62%
Research University	45%
Focus University	65%
Private University	15%
Total overall	53%

Both of these groups have more than 60% of realizations, signifying that this move is prevalent and obligatory. The APEX University, the research university group and the private university group have realization percentages lower than 60% indicating that this step is an optional strategy in the research article writing.

In addition, comparisons on the findings between the Computer Science discipline and the Computer Science sub discipline shows that summarizing the research methods are more prevalent in the Computer Science discipline. The percentage of realization is at 80% for this group while the sub discipline group only have a realization of 38%. The difference of the percentages between the two groups is significant. This is because the percentage for the Computer Science group indicated that this step is an obligatory strategy whereas the

percentage for the Computer Science sub discipline indicated that this step is an optional strategy. Only a small number of the research articles in the sub discipline group preferred to explain on the research methods in the research article introductions compared to the research articles in the Computer Science group. This step is optional for the Computer Science sub discipline research articles and is obligatory for the Computer Science research articles.

However, comparison on the findings between the highly cited research articles and the research articles with zero citation indexed showed that this step is more prevalent amongst the highly cited research articles. The highly cited research articles group has 55% of realization compared to only 40% realization for the research article with zero citation indexed. Despite the variance in the percentages, the difference is not significant as both percentages indicated that this step is optional for both groups. The realization of this strategy appears to be the same for the highly cited research articles and the research articles with zero citation indexed.

All in all, while the analysis of this finding shows that summarizing the methods is an optional step for the research articles in this corpus, the importance of this step is perceptible. Given that the highly cited Computer Science research articles are using this step at an obligatory level, pedagogic implication is suggested. The utilization of this strategy is suggested to be incorporated and promoted in the teachings of Computer Science research article writing.

The findings of the interview on whether summarizing method should be written on in the introduction section suggest that all interviewees are for it. Interviewee S, Interviewee N and interview K agreed that the method of the study should be written briefly in the introduction section. On the question whether she wrote the method of the study in the introduction paragraph, Interviewee N said **"Ya.. ya.. ada jugak ikutnya** introduction **ni macam** short**.. er..er.. macam very** brief of the introduction**".** < Yes.. yes.. sometimes. Actually introduction is kand of short.. er..er.. very brief of the introduction > (line 101-102). Interviewee N also expressed similar positivism in answering the same question. **"A..** yes yes **(aa) kena** summarize **sebab dalam kita punya** introduction **tu** especially background **la kena macam sekali orang baca orang dah boleh agak apa kita punya** research **tu** is all about**".** < A.. yes yeas must summarize because in our introduction, especially the background we must , like on the first reading, people can guess what our research is all about> (Lines 81-83).

Interviewee K concurred that the method should be mentioned in the introduction section however stresses that the explanation must be brief and concise.

> **Method tu selalunya kita tak** elaborate **la kat** introduction**.. Kita lebih ke** body the part **(hmm)** part of the body **tu la kan (hmm) sebab kalu nak cakap kat** intro **pun kita just cakap kita pakai** technique **ni sekian sekian aa kan..** how does technique **ni** works **aa selalunya in** details **kita akan letak kat** body **lah. Selalunya kat** intro **kita tak** mention detail **la**
> <Usually, we don't elaborate the method in the introduction. We are more on the body part there part of the body because if we want talk about it in the intro then, we just mention on the technique this and that. How does the technique works usually we put these details in

the body. Usually in the intro, we don't give the detals. > Transcript K, Line 75).

Interviewee A expressed similar idea as "it is important to give a brief view what are the methods being used" and reason out that "this will attract readers to know more of what has been done and what are the methodologies behind it".

In short, all the interviewees agreed that the method should be mentioned in the introduction section for a few reasons such as informing the reader early on what the research will be on, and attracting the reader to read further. Nevertheless, the expert writers asserted that the statement on the method must be brief and short.

Analysis on the realizations shows that this step has been realized using 2 techniques which are :

1. By describing the process and procedures.

2. By justifying the chosen methods

The following quotations showed how this step is accomplished in some of the articles. The quotations showed that this step is realized in a direct manner. Unlike the previous steps that were accomplished through a number of techniques, this step is identifiable either by description of process and procedures or by the justification of the method used.

Summarizing the methods by describing the process and procedures.

1 "In this study, *we construct a series of* new RD code families, and

2 then *we design the structure* of both the transmitter and the receiver
3 with different decoder schemes. Finally, the eyes diagram and the bit
4 error rate of *our system is evaluated and compared with other*
5 *codes*". (Sic)

(F12 UniMAP)

1 "In this paper, a technique called *maximum dependency of attributes*
2 *(MDA) is proposed*. It is based on the dependency of attributes using
3 rough set theory in an information system. Four *test cases are*
4 *considered to evaluate and compare* the performance of MDA with
5 BC, TR and MMR techniques: The credit card promotion dataset as
6 in [18], the student's enrollment qualifications dataset, animal's
7 dataset as in Hu [19] and the dataset as in Parmar et al. [11]."

(F1 UTHM1)

In both excerpts (F12 UniMAP, F1 UTHM1) the processes on how the particular technique or method in used are clarified in a few words. In excerpt (F12 UniMAP) the phrases of "we construct a series" (line 1), "we design the structure" (line 2), "our system is evaluated and compared with other codes" (line 4-5) are positioned to briefly describe how the study was conducted. The method of the research was briefly explained.

In the next excerpt (F1 UTHM1), the phrases "maximum dependency of attributes (MDA) is proposed"(line 1-2) and "test cases are considered to evaluate and compare" (line 4) clearly described the method of the study. Both excerpts (F12 UniMAP, F1 UTHM1) have illustrated how Move 3 Step 4 *Presenting the research niche: Summarizing method* (Swales. 2004: 232) is realized using the first technique which is summarising the method. Other techniques used to realize Move 3 Step 3 is explained in the following section.

Summarizing the methods by justifying the chosen methods.

Using this technique to realize Move 3 Step 4 *Presenting the research niche: Summarizing method*, justification on the method used in the research is given. Explanation is given on why the process taken is necessary and reasonable. Rather than explaining how the process is carried out, the reason as to why the choice is made is rationalized.

1 This paper presents the detection of vocal fold pathology *with*
2 *the aid of the speech signal recorded from the patients. Time-*
3 *domain features are proposed and extracted to detect the vocal*
4 *fold pathology. In order to test the effectiveness and reliability*
5 *of the proposed time-domain features, a Probabilistic Neural*
6 *Network (PNN) is employed.*

(F12 UniMAP1)

1 *In this proposed technique, the reusability and diversity*
2 *requirements are solved by the inner product mixing sequence*
3 *that yield a transformed version of the biometric*, while the one-
4 way transformation property is strengthened by the proposed
5 Ud-MsD method. The performance issue of BioHash in stolen-
6 token scenario is eliminated *using the proposed Ud-MsD, which*
7 *provided a finer grain of discretization and controlled*
8 *information loss* as compared to the original BioHash
discretization.

(P6 MMU6)

In excerpt (F12 UniMAP1), the phrase in line 1 to 4 illustrates the previous technique. Whereas the sentence in line 4 to 6 show how Move 3 Step 4 *Presenting the research niche: Summarizing method* is realized by giving justification on the method. Excerpt (P6 MMU6) also summarizes the methods by justifying the chosen method. The justification was as in "the reusability and diversity requirements was solved by the inner product mixing sequence that yield a transformed version of the biometric" line 2 and "which provided a finer

grain of discretization and controlled information loss" lines 5 to 7. The justifications on the choice of method briefly explained about the method therefore fulfilled Move 3 which is *presenting the present work.*

In short, the findings indicated that *summarizing method* is an optional step for the research article introductions in this study across university group, journal, citation rate and subdisciplines of Computer Science. The interviewers all concurred that methods should be mentioned briefly in the research article introductions. Analysis on the realizations found 2 techniques that have been used to fulfil this step which are by describing the process and procedures, and by justifying the chosen methods.

The next step in Move 3 is Step 5 *Announcing the principle outcomes* and the findings of the study are explained in the next section

4.2.3.5 Move 3 Step 5: Announcing principle outcomes

In this section, Move 3 Step 5 *Presenting the present research: Announcing principle outcome* is explained. And then, the percentage of occurrence for Move 3 Step 5 according to university groups, journal type, subdisciplines and citation are presented. Next, the manner on how *Announcing principle outcomes* is realized in this corpus is explained.

Announcing the principle outcome of the study is a step, suggested as a probable in some field but unlikely in others in CARS model (2004). However, the

studies on Computer Science research article showed that this step is obligatory (Posteguillo, 1999; Shehzad, 2007; Shehzad 2010).

Swales and Najar (1987) emphasized the need for announcement of principle outcomes in the introduction section of the research articles. The announcement of the principle findings are made in the introduction sections rather than hoping for the chance that the reader would read all the papers up to the result section (Shehzad 2010). The scientific writers also highlight the major findings of the research to establish the research contribution as early as possible (Kanoksilapathnam, 2007). Table 4.20) shows how the step is realized in the corpus according to the university group. The percentages of *announcing principle outcome*s by all of the university groups are less than 20 percent and this indicated that this is an optional strategy by the writers of the research articles in the corpus.

Table 4.17

Findings on M3S5 by the university group

University Group	Percentages for presenting the present research work via announcing the principle outcome
Apex University	18%
Comprehensive University	0%
Research University	14%
Focus University	20%
Private University	15%
Total overall	15%

As indicated in Table 4.20, the highest percentage of *announcing principle outcome* is by the research articles from the focused university group which is at 20 percent while none of the research articles from the comprehensive university

group utilized this strategy. Apex university and private university realized this step at 18% and 15% occurrence respectively.

In addition, analysis on the highly cited and zero cited research articles on the announcement of the principle finding found that the highly cited research articles are more inclined to accomplish this step compared to the other group. The percentage is at 14 percent and 12 percent respectively. These differences indicated a slight difference in preference on strategy used between the groups.

Similarly, analysing the corpus based on the journal wise population, the research articles from Malaysian Journal of Computer Science used this step more frequently compared to the research articles in the Pertanika journal. 28 percent of the research articles in Malaysian Journal of Computer Science utilized this step whereas only 10 percent of the research articles in the Pertanika journal accomplish this step in the introduction section. The analysis using the expert view showed that the research articles classified as computer science discipline used more of this step compared to the research articles classified as in the sub discipline of Computer Science. 20% of the Computer Science research articles attempted this step and only 10% of the research articles in the sub discipline utilized this step.

The findings of the interview indicated a mixed preference on whether announcement of the principle finding should be made in the research article introduction or not. Interviewee N agreed that brief statements on the research findings must be made in the research article introduction. Answering to

whether the announcement of principle findings should be made in the introduction section, she answered **"**Principle finding a little bit yes**.** A little bit **macam** <like**>** abstract <write it is ok> **pun letak a macam ok..** our method have solved like, have improved like 50 percent from the previous method**"** **(**line 103- 105). She somehow cautioned that the details on the findings should not be in the research article introduction. She explained **"I saya letak sikit sikit kita punya** contribution **kan.. soo the** improvement **berapa** percent result **sikit la bukanya dia nak** details**"** <i just put a little bit of the contribution, so the improvent how many percent, just a bit, they don't want details> (line 101-112).

Interviewee K also feels that the findings can be mentioned in the introduction but then again cautioned not to be too detail otherwise the introduction section is doomed to be too long and boring.

> Findings **selalunya dekat intro kita tak** really mention **la. Macam mana nak cakap aa. Tengok** subject **tu jugak , ada jugak** sometimes **tu kita nak cakap ok..**the technique **yang kita perkenalkan ni dalam ni dapat membantu menyelesaikan masalah ni macam tu...a... tapi ...a....apa tu..secara** details **nya..kita tak** mention **dekat (ehm...) nanti kita panjang sangat pun** boring **jugakkan hehe Baik kita letakkan** findings **tu nanti kita letak kat** conclusion. **(a.. letak kat conclusion) kita akan** stress **lagi kat** conclusion**.**
> <We don't really mention findings in the intro. How to say this.. depends on the subject. The techniques we propose helps to solve problem but the details we don't mention here will be too long then it will be boring. It is better to put the findings in the conclusion (aa.. in the conclusion?) we shall stress it again in the conclusion.> (Transcript K, line 92-98)

On the other hand, Interviewee A and Interviewee S perceive that the findings should not be put in the introduction. Answering to whether the principle

findings should be mentioned in the introduction section, he directly answered "No. This is usually covered in literature review and results section" (Transcript A, line 21) Interviewee S also mentioned the same **"saya kalu kat abstrak haa kat abstrak kalau yang..kalau principle finding saya letak dekat abstrak"** < I will put in the abstract. For principle findings I put them in the abstract> (Transcript S, line 114-115). While Interviewee N prefered to write the *Annoucing principle outcomes* in the abstract, Interviewee A adviced that the *Annoucing principle outcomes* should be made in the result section.

Analysis in the realizations of the step on *Annoucing principle outcomes* found 2 techniques in which this step is fulfilled. The techniques are by making a direct announcement on the findings and by embedding the announcement with the other steps of moves3. Some of the realization of this step is direct and recognizable compared to the other previous steps. The following excerpts (F1 UTHM1, F5 UTEM1) illustrate how this step was accomplished in a direct manner.

> "We show that the proposed technique *provides better performance* with that of BC, TR and MMR techniques "
>
> (F1 UTHM1)

> "It will be shown (sic) that the simple approach to design discontinuous SVPWM results in high speed in computing the overall algorithm and hence *produce high switching frequency and low current harmonic distortions* in the induction motor drive system."
>
> (F5 UTEM1)

F1 UTHM1 clearly announces the "better performance" (lines 1-2) with the use of the techniques, while (F5UTEM1) explicitly explains the purpose before announcing the principle outcomes (lines 3-4).

Announcing principle outcome has also been embedded in the other steps as in the following quotation (F3 UTHM3). In the first line, the announcement of the principle outcome is embedded with the positive justification and announcement of the intended research. The phrase on "To address these issues" refers to the research gaps mentioned in advance and this phrase implies that the present study intends to fill the research gap stated earlier. The step of announcing the principle finding is realized in the phrase of "...DPR design flow and environment to accelerate the development of partial reconfiguration platform and validation through a range of intellectual property (IP) cores..." (line 1-4). Even though the principle finding is not a direct announcement, the phrase entails that the finding is related to the DPR design which is aimed to " accelerate the development of partial reconfiguration platform and validation through a range of intellectual property (IP) cores". Whether or not the proposed design has been achieved, the readers' attention is captured to read the research article further.

> "**To address these issues**, this paper proposes a **DPR design flow and environment to accelerate the development of partial reconfiguration platform and validation through a range of intellectual property (IP) cores** used in image and signal processing for adaptive applications."
>
> (F3 UTHM3)

In short, the findings indicate that *Annoucing principle outcomes* is an optional step for the research articles in this study. The interview suggests a mixed preference; with more interviewees prefered to write this step in other section. Analysis in the realizations of the step on *Annoucing principle outcomes* is fulfilled using 2 techniques which are by making a direct announcement on the findings and by embedding the announcement with the other steps of moves3.

Next, let's look at Move3 Step 6, which is stating the value of the present research.

4.2.3.6 Move 3 Step 6: Stating the value of the present research

In this section, Move 3 Step 6 *Presenting the present research: Stating the value of the present research* is explained. And then, the percentage of occurrence for Move 3 Step 6 according to university groups, journal type, subdisciplines and citation are presented. Next, the interview findings on this step are described. Finally, the manner on how *Stating the value of the present research* is realized in this corpus is explained. The percentages on the realization of *Stating the value of the present research* in the research article introductions of this study are reported in table 4.18.

Table 4.18 shows that less than half of the research article in the corpus utilized this step. More than half of the writers of these research articles avoided or preferred to skip this step.

Table 4.18

Findings on M3S6 by the university groups

University Group	Percentages for presenting the present research work via stating the value of the present research
Apex University	35%
Comprehensive University	19%
Research University	39%
Focus University	30%
Private University	35%
Total overall	35%

This step is considered as optional for these groups of writers. Such practice contrasted with the practice of the global Computer Science writers which have been reported to have this step as obligatory (Posteguillo, 1999; Shehzad, 2007; 2010).

Similarly, analysis on the high citation and zero citation research articles found that this step is more utilized by the high citation group compared to the zero citation groups. 44 percent of the research articles in the high citation group made use of this step whereas only 28 percent of the research articles in the zero citation group realized this step. The percentage difference between the two groups is bigger for this step compared to the difference in M3S5, indicating the different preference on strategy use between the two groups is more evident for this step.

In addition, analysis using journal wise population shows that the research articles in the Malaysian Journal of Computer Science are more inclined to state the value of their studies compared to the research articles in the Pertanika

journal. 57 percent of the research articles in the Malaysian Journal of Computer Science accomplished this move while only 26 percent of the research articles in the Pertanika journal chose to use this step in the introduction section of the research articles.

The biggest difference of percentage is between the groups of research articles with high and low citation. The highly cited research articles fulfilled this step at 42% where as the research articles with low citation realized this step at only 12%. The big difference in percentage between the two groups indicated the different preference between these groups.

The findings of the interview suggests that Interviewee A agreed that the value of the research must be written in the introduction section. The reason given was that it "is important to relate your research and the contribution to the knowledge" (Transcript A, line 23-24). Interviewee S also felt that the value can be mentioned in the introduction section but this must be done briefly as she said **"saya sebut aa tp saya sebut secara..secara ni je lah** because **saya akan banyak** significance **tu akan banyak kat** discussion **nanti (a..) dekat** conclusion**"** < I mentined it but I mentioned it just so .. because I have most of it in the discussion later in the conclusion> (Transcript S, line 124-126). Interviewee K on the other hand felt that such announcement can be made in the introduction section but she personally did not practice this step. She said **"tak de mention sangat kut kebaikan tu sebab kat conclusion selalu kita buat la. tapi kalu mention pun boleh jugak secara ringkas.** < the value is not really

mentioned because we write that in the conclusion but ok if mentioned briefly> (Transcript K, line 103-107).

The following excerpt (P13 UNITEN1) illustrates how this step is fulfilled. The word "new" is used to imply the novelty of the study and thus promotes the value of the present research.

"In this paper a *new* configuration of fuzzy controller is proposed"

P13UNITEN1

The following quotations (F3 UTHM3, UMP6 UTHM8, F5 UTEM1) illustrate how the step on "Stating the value of the present research" has been realized in a few research articles in the present study.

"...this project is proposed to develop a system to facilitate the home owner *to optimize usage of electricity* remotely using SMS." (F3 UTHM3)

In excerpt F3 UTHM3, "this project is proposed to develop a system to facilitate the home owner" realized Move 3 Step 1 which is *Presenting the present work : Announcing the present research purposively* and then, the writer of this excerpt continues to assert Move 3 *Presenting the present work* by using Move 3 Step 6 which is *Presenting the present work : Stating the value of the present research* in phrase "to optimize usage of electricity". This phrase denotes the value of the study by indicating the usefulness and worthiness of the research outcome.

> To overcome such situation, Student Evaluation System is build to computerize the current system and *helps to evaluate in more consistent and precise way.*
>
> (F4 UMP6 UTHM8)

Similarly in excerpt (F4 UMP6 UTHM8), Move 3 Step 1 *Presenting the present work: Announcing the present research purposively* is realized first before stating the value of the present research. The phrase "Student Evaluation System is build to computerize the current system" fulfilled Move 3 Step 1 and then, the writers proceed to state the value of the research as "helps to evaluate in more consistent and precise way." The value of the research outcome is asserted and signified. .

> Our effort is to verify the simplified method and propose some *new techniques* in defining the sector of space voltage vector and calculation the on-duration of PWM signals (F5 UTEM1)

In excerpt (F5 UTEM1) Move 3 Step 6 *Presenting the present work: Stating the value of the present research* is realized by using only two words "new techniques". This is still considered as a value because "new technique" suggests an extension from the existing techniques. Many of the research articles in the corpus use similar words to indicate the value of the study. Some other words used to highlight the value of the present research are "an intelligent" (F7 UMP1; F8 UMP2) "A new feature" (F8 UMP2) which brings the study appeal importance.

With regards to the findings mentioned, the concept of promotional strategies in research article introductions is adopted. The promotional strategy which falls in the category of rhetorical persuasion is realized by employing situational appropriately, artfully stylized language and generates commonality between speakers and their audiences. (Juzwik, 2005). The various writing motivations could be the reason why promotional strategies have gained some popularity. As summon up in Afros (2007) "scientists seem to be promoting their work to a degree never seen before...". The acts of promoting their work are also presence in research article writing which at a glimpse may appear straight to the point and concise (Afros and Schryer, 2009).

The link between the problems faced by the writers and the problems in the utilization of the moves in CARS model is redefined. Move 3 Step 5 "Announcing principle outcomes" is considered as the most problematic step, therefore, the analysis of the interview is made by focusing on this step. This step is considered the most problematic because it has been avoided by the writers in this corpus instead of being utilized as an obligatory step as suggested by previous researchers (Posteguillo, 1999; Anthony 1999& Shehzad, 2010). The text analysis indicated that Move 3 Step 5 "Announcing principle outcomes" is realized in only 15% of the text. The percentage is farfetched from the findings by Posteguillo (1999) at 70%, by Anthony at 75% and by Shehzad (2012) at 73%. Given that these studies (Anthony, 1999; Posteguillo, 1999 & Shehzad, 2012) also analysed the research articles in Computer Science discipline, the low percentage found in this study indicates that this step is the

most challenging step for the academicians in Malaysian universities. The analysis of the interview shows the different views on what should go into the introduction section.

The interview data from the two interviewees on the step for "announcing the principle findings" suggest that the different preferences on how much of the details on finding is necessary to be included in the research article introduction. While the writers agree that announcement of the finding needs to be included in the research article introduction, they have different opinions on how much of the details is to be included. Interviewee N and Interviewee K both agree that the announcement of the research findings must be included in the research article introduction section. Interviewee N agreed that

> "Principle finding a little bit yes. A little bit *macam* <like> abstract <to write is ok> *pun letak a macam ok*..our method have solved like, have improved like 50 percent from the previous method" (line 103-105). While agreeing that the principle findings should be included in the introduction section, Interviewee n commented that the announcement must be brief and does not include the details "I *saya letak sikit sikit kita punya* contribution *kan*... so the improvement *berapa* percent result *sikit la bukannya dia nak* details" <I just put a little bit of the contribution, so the improvement how many percent, just a bit of the contribution, so the improvement how many percent, just a bit, they don't want details> (line 101 -112).

Interviewee K also agrees that the findings can be mentioned in the introduction but then again cautioned that the announcement should not be too detailed to avoid it from being too long and bore the readers.

> Findings *selalunya dekat* intro *kita tak* really mention la. *Macam mana nak cakap aa. Tengok* subject *tu jugak, ada jugak* sometimes *tu kita nak cakap* ok... the technique *yang kita perkenalkan ni dalam ni dapat membantu menyelesaikan masalah ni macam tu a tapi.. a.. apa tu secara* details *nya kita tak* mention *dekat (ehm) nanti kita panjang sangat pun boring jugakkan hehe baik kita letak* findings *tu nanti kita letak kat* conclusion. (*a.. letak kat* conclusion) *kita akan stress lagi kat* conclusion.
>
> <We don't really mention findings in the intro. How to say this... depends on the subject. The techniques we propose helps to solve problem but the details we don't mention here... will be too long then it will appear boring. It is better to put the findings in the conclusion (aa...in the conclusion?) we shall stress it again in the conclusion> (Transcript K line 92 -98)

On the contrary, the findings from the other two interviewees indicated the hesitation on announcing the findings in the introduction section. Interviewee A said "No. This should be covered in literature review and result section" (Transcript A, line 21). Interview S commented on the same disagreement " *saya kalu kat abstract haa…kalu principle finding saya letak kat abstrak*" <I will put in the abstract…for principle findings I put them in the abstract> (Transcript S, line 114-115). Interviewee A prefers to announce the principle finding in the result section while Interviewee N prefer to make the announcement in the abstract. The data from the interview has described the different views that writers have on this particular strategy however, the findings of the interview is not to be generalized to all of the participants.

The findings from this study indicated that the highly cited research articles are more insistent in promoting the value of the research work and announcing the findings of the study. This way the readers can anticipate the value and relevance of the research being presented. The research articles that have not

been cited accomplished this strategy at a lower rate. Many of the articles in this group do declare the findings and value of the study. However, the announcement was delayed, appeared later or made in the finding and discussion section which is in the latter half of the research article. Afros (2009, p.3) found that "promotionalism permeates scholarly discourse" and suggested one of the rhetorical strategy for writers to publicize their work is to give "positive evaluation of one's own study".

In short, the findings of the text analysis that this step is deemed as an optional step in the research articles of this study. The interviews suggest a mix preference on whether or not the announcement on the findings should be made in the research article introductions. Another step in Move 3 is Step 7 which is *Outlining the structure of the paper*. This step is described in the following section.

4.2.3.7 Move 3 Step 7: Outlining the structure of the paper

In this section, the explanation of Step 7 in Move 3 is given and then, the percentage of occurrence according to university groups, journal type, subdisciplines and citation are presented. Next, the interview findings are described and finally the manner on how this step is realized is explained.

Move 3 Step 7 in CARS model is on *Outlining the structure of the paper*. In CARS model (Swales, 2004), this step is suggested as optional and probable in some field but unlikely in others. This step is also described as less fixed in the

order of occurrences. The following table (Table 4.19) illustrates the percentage of realization for this move according to the university group.

Table 4. 19

Findings on M3S7 by the university groups

University Group	Percentages for presenting the present research work via Outlining the structure of the paper
Apex University	30%
Comprehensive University	56%
Research University	28%
Focus University	25%
Private University	50%
Total overall	34%

Table 4.19 shows that only 34% of the research articles in the corpus utilized of this strategy. The highest percentage of occurrence is at 56% by the Comprehensive university group, followed by the Private university group at 50%. Only 30% of the research articles from the Apex University resorted to this strategy. The Research university group and the Focus university group utilized this step at 28% and 25% respectively. In conclusion, for this corpus, this move is considered as optional and non obligatory as such comply with the CARS model (Swales, 2004).

The analysis using the journal wise sampling found that the research articles in the Malaysian Journal of Computer Science were more prone to use this strategy compared to the research articles in the Pertanika journal. 57% of the research articles in the Malaysian Journal of Computer Science employed this step

whereas only 8% of the research articles in the Pertanika journal utilized this move.

The comparison between the highly cited research articles and the zero cited research articles showed a bigger difference in preference. The research articles in the highly cited group are more inclined to utilize this move compared to the research articles in the zero cited group at. 36% of the research articles in the highly cited group gave the outline structure of the paper however only 20 % of the zero cited group accomplished this move. Similarly, the comparison using the expert view showed even a bigger difference in preference. More than half of the Computer Science research articles used this step while the sub discipline research articles hardly used this step. 60% of the research articles in the Computer Science category were identified to have completed this step on *Outlining the structure of the paper*. Only 15% of the sub disciplinary research articles were found to have made used of this strategy.

The findings of the interview indicates that Interviewee K, Interviewee N and Interviewee A all agree that the outline and structure of the paper must be written in the research article introductions (Transcript K, Line 111-114 Transcript N, Line 129) expressed that "before we start a new section... final paragraph on the introduction... we do have the organization of the paper... briefly". Interviewee A advised that it is "important to give a brief introduction of (sic) the topics that will be covered throughout the research paper" the reason given by Interviewee A is that this can "crate (sic) an attraction to the reader to

read further". Interviewee S on the other hand reported that the outline on the structure of the paper is done in the abstract not in the introduction.

These are some of the examples on how *outlining the structure* of the research paper was fulfilled in some of the research articles in the corpus. The following excerpts (F2 UTHM2, F8 UMP2, F10UMT1USM3) illustrate how this move is realized in some of the research articles. The realization of the move was direct and uninterrupted by any excessive language.

1 The structure of the paper is organised as follows. An
2 overview of the related work of DPR design flow,
3 environment and application is given in Section 2. Section 3
4 presents the proposed design flow and environment. Section
5 4 exposes the case study of the IP cores used in image and
6 signal processing adaptive applications. Ex- perimental
7 results and analysis are described in Section 5. Finally,
8 concluding remarks are given in Section 6. (F2 UTHM2)

In the excerpt (F2UTHM2), Step 7 on *outlining the structure of the paper* begins with a clear statement on the intention of explaining the structure of the paper as in line 1 "The structure of the paper is organised as follows". And then the writer proceeds to explain what each section will be on from line 2 to 8. Such way of writing lay out the structure of the paper in a clear manner that makes the read know what to expect from the article

1 This paper is organized as such that in Sections 2 and
2 3, a brief background of GRNN architecture and
3 neuro-fuzzy are described. Section 4 describes the
4 neural network implementation for vulnerability
5 assessment and Section 5 describes the neuro-fuzzy
6 implementation for load shedding. Results and
7 conclusions are given in Sections 6 and 7,
respectively.
1 (F8 UMP2)
2 The remainder of the paper is organized as

3 follows: Section 2 introduces the fuzzy set
4 theory and its fundamentals; Section 3
5 discusses the fuzzy offline handwriting
6 signature modeling(sic) using fuzzy
7 interpolation rational cubic Bezier
8 curve(FIRCBC); Section 4 the alpha cut of
9 triangular fuzzy number implementation in
10 fuzzy offline handwriting signature modeling
11 (sic); Section 5 introduced confidence fuzzy
12 interval of offline handwriting signature;
13 Section 6 the defuzzification method; Section 7
14 discussion about the method and the
15 application; In Section 8 the conclusion

(F10 UMT1 USM3)

Similarly in these excerpts (F8UMP2, F10UMT1USM3), the intention to outline of the paper is conveyed (line1). And then, the writer briefly described the content of each the sections. However for excerpt (F10UMT1 USM3) there is a grammatical error in the way the content and sections are described. The description for section 4 is a fragment as in "Section 4 the alpha cut of triangular fuzzy number implementation in fuzzy offline handwriting signature modeling (sic)" the verb is missing in this description. The other two sections are also in fragments "Section 7 discussion about the method and the application" (line 14) and "In Section 8 the conclusion" (line 15).

This study found that the language in use for this step was straight forward and devoid of any elaboration or fancy language. Shehzad (2010) also hinted that the step is rather monotonous and suggested some inclusion of a section on stylistic method.

All in all, the moves and steps typically found in the research article introduction in computer science discipline that are written by academicians in Malaysian

universities do conform to the moves and steps suggested in the CARS model (Swales, 2004). However, findings also show that there is insufficient realization in some of the steps that are commonly used in Computer Science research articles as suggested in the key studies (Posteguillo, 1990, Shehzad, 2008, 2010, 2012). The inadequate occurrences denote the problems in writing the Computer Science research article introductions. Still, there are other problems that are not related to the moves and steps. The following section presents the findings on the problems faced by the Malaysian academicians in writing the Computer Science research article introductions.

4.3 Summary of findings on the Move analysis

The summary of the Micro analysis begins with the general findings on the move analysis done on 150 research article introduction sections which consist of 98,597 words using the CARS model (Swales, 2004). The analyses was meant to obtain the description and understanding on the way the structures are in Computer Science research articles written by the academicians in the Malaysian universities. After the summary and discussion on the general findings, the summary on the identified techniques on how the moves and steps were realized in the corpus are discussed.

Next, the data from the analysis is summarized and discussed according to the computer science and sub discipline, journal types and citation index Identification of the moves and steps provide description and understanding on what rhetorical strategies were used and how the strategies were achieved (Swales, 2004). At the same time, the findings of the interview conducted with

four interviewees are also discussed along with the findings of the move analysis to identify the reasons and problems of the writing structure identified. To begin with, the following section summarized the general findings of the move analysis.

The general findings in Table 4.23 showed that all the moves in Swales model are realized at obligatory level in this corpus. Move 1, 2 and 3 are accomplished at 94%, 100% and 86% occurrences respectively. The finding indicates that the writers of the research article introductions in this corpus have utilized the main rhetorical strategies which have been suggested in the CARS model (2004).

Table 4. 23

Summary of the general Moves and Steps

Moves and Steps		Percentages
Move 1	Establishing a territory Topic generalizations of increasing specificity	94
Move 2	Establishing a Niche (Citations possible)	100
	Step 1A Indicating a gap	73
	Step IB Adding to what is known	99
	Step 2 Presenting positive justifications (optional)	62
Move 3	Presenting the present work	91
	Step 1 (Obligatory) Announcing present research descriptively and/or purposively	86
	Step 2 (Optional) Presenting RQ or hypothesis	1
	Step 3 (Optional) Definitional clarifications	17
	Step 4 (Optional) Summarizing methods	53
	Step 5 (PISF) Announcing principle outcomes	15
	Step 6 (PISF) Stating the value of the present research	35
	Step 7 (PISF) Outlining the structure of the paper	34

However, close examination on the steps used to accomplish these moves showed that some of the recommended steps are not being used. Interviews

finding showed that not only the writers are unaware of these underutilized step, they also considered this step as odd.

Findings from the interview and move analysis indicated that Move 1 is prevalent in the research article introductions of this study at 94% occurrence. The analysis on Move 1 in the research articles found that Move 1 *Establishing a niche* was realized using a few techniques which are by providing description related to the study, by giving definition related to the study and by commenting on the general topic of the research. Even though, Move 1 has been utilized by the writers, there is room for improvement particularly when citation has been delayed and omitted in some of the research articles. This leads to the implication of the study for writing instructors which is explained in the following section 5.2

Next, findings in Table 4.23 conclude that Move 2 is present in all the research articles in the study. All of the research articles have successfully established the specialized area of the research in the Introduction section. The most frequent step used to realize Move 2 is via *Adding to what is known* at 99% occurrence, followed by *Indicating a gap* at 73% realization. In accomplishing Move 2, *Adding to what is known* is utilized in 100% of the research article introductions therefore this step is an obligatory step for the research article introductions in this corpus. This step is found realized by giving information and ideas with no citation, by adding comments and ideas to the cited work, and by developing the idea from cited work via adding other cited works. On the other hand, *Indicating a gap* is realized in only 73% hence classified as an optional step. Four

techniques on how this step is realized in the corpus have been identified which are by indicating limitation in the research area, by suggesting a problem that needed to be solved, by conveying the suggestions of research by previous researchers and by extending the works of others and illustrated. The least preferred Step for this move is *Presenting positive justification* which is utilized at 62%. 5 techniques on how this step is realized in this study have also been identified which are: Direct justification on the need for the study, direct justification on the benefit of the study. Indirect justification by giving the drawbacks of not having the study, Embedded in Move 3, and the last one by using a combination of techniques.

Finally on Move 3, the occurrence at 91% sets this Move as an obligatory Move for this corpus. While Move 3 is an obligatory move in the research article introductions of the study, all of the steps in Move3 are at Optional level, even for Step 1 which is prescribed as an obligatory step in CARS model (Swales, 2004). Move 3 Step 1 *Announcing the present research* realized at 86%, is an optional strategy hence indicates that the Computer Science academicians in Malaysian universities are utilizing the strategy at a lower rate compared to the realizations in Computer Science research article studied at global scale that have this step as an obligatory strategy (Shehzad 2010, Posteguillo 1999). Four techniques used to realizing this step were found which are announcing the present research descriptively, *announcing the present research purposively*, using the research objectives and by embedding the announcement into the other steps in Move 3. On Move 3 Step2 only one of the research articles attempted

this strategy. Besides, the interview revealed a mix perception on whether research questions should be written in the introduction section or not. Base on the findings, this study suggests that this step is taken out from the move and step description of this group.

On Move 2 Step 3 which is the strategy to use *definitional clarification* in presenting the research work from the text analysis, 17% of the research article introductions in the study make used of this step. The study also identified 2 techniques used in giving *definitional clarifications* which are by giving reference and by giving a regularized meaning to the term throughout the research article. Move3 Step 4, *summarizing method* is realized at 53% hence considered as an optional step for the research article introductions in this study. The interviewers all concurred that methods should be mentioned briefly in the research article introductions. Analysis on the realizations found 2 techniques that have been used to fulfil this step which are by describing the process and procedures, and by justifying the chosen methods.

For Move 3 Step 5, *Announcement of principle finding* is realized at 15% thus categorized as an optional step for the research articles in this study. The interview suggests a mix preference; with more interviewees prefer to write this step in other section. Analysis in the realizations of the step on announcement of principle findings is fulfilled using 2 techniques which are by making a direct announcement on the findings and by embedding the announcement with the other steps of Move 3. The next strategy of Move 3 Step 6, *Stating the value of the present research* has only 35% realization therefore considered as an

optional step for the research article introductions in this study. Finally the strategy of *Outlining the structure of the paper* is realized in 34% of the research article introductions.

The other problems identified in this study are mistakes in the usage of tenses and Subject-verb-agreement. However, the errors occur in less than 20% of the article and almost unnoticeable. The small number may be due to the fact that these research articles are peer reviewed hence the mistakes might have been corrected. Moreover, as these research articles are published in Scopus index journals, apart from the few mentioned, such problems would have been ironed out by the editors prior to publication.

Interview findings brought forth the problem on *justifying claims* which is related to explaining and mitigating the claims made on the contribution of the study. While CARS model has Move 3 Step 6 stops at *Stating the value of the present research*, the interviewees expressed that justifying such statement is not easy. Justifying claims is about writing convincing supports for the statement on the value of the present research. A few interviewees expressed the difficulty in justifying claims on the contribution of the study.

Another problem raised from the interview is the "Stereotype sentences" and "sustaining the readership" which appear when composing the research articles as the sentences turn out to be similar and resemble the previous sentences in the previous writings. After three or more articles on the same area, the sentences

became more alike. Attracting readership and sustaining the reading interest are also reported as problematic.

4.4 Summary on the Move and Steps by University Group

This study categorized the writers into the different types of universities because the group of the university determined the research role and funding assigned. The study wanted to investigate if there were any difference in employment of rhetorical strategies when the writers are affiliated with universities that have bigger research role and bigger research funding.

The research emphasis and competition is high in the top groups therefore poses question on whether the writers from these top university groups are employing more "promotional strategies" (Shehzad, 2010) compared to those in the groups that have less publication commitments. For this reason, the university group is included as a criterion in the selection of the Malaysian Universities Computer Science Scopus Articles corpus. The findings according to university group are illustrated in table 4.24.

The analysis found that the difference between the groups is only at 2% indicating that there is not much difference in the overall employment of Moves and Steps between the University groups. However, the analysis on the promotional strategies indicated that the APEX and Research university groups have the highest percentage followed by the Private University group and the Focus University Group.

Table 4.24

Findings on M1 and M2 according to university group

ID	M1	M2	M2 S1A	M2 S1B	Rcy	M2 S2
APEX	80	100	75	95	100	53
Compre -hensive Univ	90	100	55	100	94	62
Research Univ	100	100	53	100	96	62
Focus Univ	100	100	62	100	100	55
Private Univ	96	100	62	100	90	75
Average	94	100	62	99	96	62

The promotional strategies proposed by Shehzad (2010) are realized using Move 3 Step 5 and Move 3 Step 6. The percentages of these steps are added and the totals are divided by two to derive an average for promotional strategy. The promotional strategy average score are highest at 26% from the APEX university and Research university group. Next, is at 25% from the Focus University group and the Private University group. The Comprehensive university group has the lowest percentage at 19%. The research articles from the Comprehensive university group do have the principle outcomes and the value of their research written in the article but the information is delayed towards the end of the article particularly in the discussion and conclusion sections. It is alarming that even the highest total which is at 26% is farfetched from the findings by Shehzad (2012). The corpus in Shehzad (2012) have 73% for Move 3 Step 5 and 55% bringing the average to 64%.

Over all in terms of the average percentage for realizing all the Moves and Steps in CARS model (Swales, 2004), the Focus University group has the highest average percentage at 62%.

Table 4.25

Findings on M3 according to the university group

ID	M3	M3 S1	M3 S2	M3 S3	M3 S4	M3 S5	M3 S6	Promo. AVG	M3 S7	Total AVG
APEX	94	94	0	18	59	18	35	26	30	61
Compre -hensive Univ	94	88	6	6	62	19	19	19	56	61
Research Univ	88	82	0	16	45	14	39	26	28	59
Focus Univ	100	100	0	15	65	20	30	25	25	62
Private Univ	85	80	0	55	15	15	35	25	50	61
Average	91	86	1	17	53	15	35	24	34	61

The APEX University, the Comprehensive University Group and the Private University group have their average at 61%. The Research University group has an average of 59% which is below the corpus total average of 61%. The difference between the highest percentage and the lowest percentage is only 2% indicating that there is not much difference in the use of Moves and Steps between the University groups in this context.

In conclusion, while the analysis indicated that the APEX and the Research university groups have the highest employment for steps related to promotional strategies (Shehzad, 2010); the overall average percentages suggest little

difference in the employment of the moves and steps between the University groups

Comparing the analysis according to the University group to the analysis according to the citation index, the difference in the utilization of moves and steps is bigger for the analysis according to the citation index. The high citation index group has an average of 62% while the low citation index group has an average of 53% bringing the difference at 9%. The difference of 9% is bigger than the difference between the university group which is only at 2% indicating that the employment of the moves and steps is more varied between articles of different citation index compared to articles affiliated with different universities. The details on the findings for analysis according to citation has been explained in Section 5.1.3

The findings indicated that there are some differences in strategy employment between these two groups (Ina, Aizan& Noor Hashima, 2016). While the employment of the moves and steps may not guarantee the citation counts, analysis indicated that the writers of the articles in the two groups do make different choices on the utilization of the moves and steps.

The findings from the analysis according to the university groups are different from the findings of analysis according to journal wise population (Shehzad, 2010) and citation index. Compared to the 2% difference from the analysis according to the University group, the analysis according to the journal population indicated a bigger difference which is at 13%. The articles from the

PERTANIKA journal have an average of 51% whereas the Malaysian Journal of Computer Science (MJCS) has an average of 64% bringing the difference at 13% between the two. MJCS corpus has utilized more moves and steps compared to the PERTANIKA journal. The elaboration on the analysis according to the journal wise population is in section 5.1.2: Summary on the Move and Steps by Journal wise population.

All in all the analysis on the utilization of the Moves and Steps according to the University groups did not yield a big difference in percentage compared to analysis according to journal wise population and citation index

4.4 Summary on the Move and Steps by Journal wise population

The finding for Move 3 also confirmed that journal selection influences the way rhetorical structure is realized in the research articles. Table 4.26 summarizes that both journals do have a similar structure to the general Computer Science research article structure found in the studies using global writers work (Shehzad, 2010; 2011; 2012; Postrguillo, 1999, Anthony 1999). However, the obligatory and optional status of the Moves and Steps differed for Pertanika Journal. The research articles from the Pertanika journal did not emphasis on presenting their present work in the Introduction section.

Rather, the presentation of their research work is delayed in the next section. Such preference can be explained by looking into the Micro analysis of this journal, which shows that this journal has Materials and Method section after the

Introduction Section. Most writers began to introduce the intended study in this section instead of the doing so in the Introduction section.

Table 4.26

Move and Steps by Journal wise population

Moves and Steps		Percentages for Pertanika	Percentages For MJCS
Move 1	Establishing a territory Topic generalizations of increasing specificity	95	100
Move 2	Establishing a Niche (Citations possible)	95	100
	Step 1A Indicating a gap	71	78
	Step IB Adding to what is known	97	93
	Step 2 Presenting positive justifications (optional)	53	78
Move 3	Presenting the present work	79	100
	Step 1 (Obligatory) Announcing present research descriptively and/or purposively	76	100
	Step 2 (Optional) Presenting RQ or hypothesis	0	0
	Step 3 (Optional) Definitional clarifications	18	14
	Step 4 (Optional) Summarizing methods	39	21
	Step 5 (PISF) Announcing principle outcomes	10	28
	Step 6 (PISF) Stating the value of the present research	26	57
	Step 7 (PISF) Outlining the structure of the paper	8	57

Most of the research articles in the Malaysian Journal of Computer Science on the other hand, followed the contemporary Introduction-Method-Result-Discussion sections structure. As such, the presentations of the intended research are mostly done in the Introduction section.

However, it is important to note that the promotional steps in both journals are low compared to the findings in the studies using global writers work (Shehzad, 2010, 2011, 2012; Posteguillo, 1999, Anthony 1999). The percentages for the promotional moves are below 80%. *Announcing principle outcomes* is scored at only 10 percent in Pertanika journal and only 28% in Malaysian Journal of Computer Science. The other step related to promotional strategy is *Stating the value of the present research* which is realized at 26% in Pertanika journal and

57% in Malaysian Journal of Computer Science. It can be concluded that the promotional strategies in the research articles of both journals can be further enhance by using these two steps.

4.5 Summary on Moves and Steps by High and Low Citation Index

The analysis according to the citation index shows that the highly cited research article accomplish more of the moves and steps recommended in CARS model (Swlaes,2004) compared to the research articles that have never been cited. First, the analysis showed that research articles with high citation have a higher percentage of realisation in *presenting the present work*. 97% of the highly-cited articles accomplished this strategy while only 83% of research articles with zero citation utilised this move, suggesting that the step has been used as an obligatory step by the high citation group and as an optional step by the low citation group This also shows that the high citation group conform to CARS model (Swales, 2004) while the low citation group does not.

Secondly, the difference in percentage between the two groups in realising this move is also found in the use of *announcing the present research* descriptively. Compared with the research articles with zero citation, the highly-cited research articles were more inclined to fulfil this step at 92% which indicate that the step has been used at obligatory level, just as suggested in the CARS model (Swales,2004) model. Whereas, the research articles with zero citation use this strategy at 75% indicating that this step has been used as an optional step contrast to the recommendation in CARS model (Swales, 2004).

Finally, the findings also shows that apart from these two differences, the highly-cited research articles were also more inclined to utilise the strategy proposed in the Swales (2004) model of Move 3 compared to the research articles that had never been cited. Table 4.27 shows the summary on Moves and steps by High and Low Citation group

Table 4.27

Summary on Moves and Steps by High and Low Citation group

Moves and Steps		Percentages High Citation	Percentages Low Citation
Move 1	Establishing a territory Topic generalizations of increasing specificity	97	91
Move 2	Establishing a Niche (Citations possible)	100	100
	Step 1A Indicating a gap	86	71
	Step IB Adding to what is known	100	100
	Step 2 Presenting positive justifications (optional)	68	52
Move 3	Presenting the present work	97	83
	Step 1 (Obligatory) Announcing present research descriptively and/or purposively	92	75
	Step 2 (Optional) Presenting RQ or hypothesis	0	1
	Step 3 (Optional) Definitional clarifications	18	20
	Step 4 (Optional) Summarizing methods	55	40
	Step 5 (PISF) Announcing principle outcomes	14	12
	Step 6 (PISF) Stating the value of the present research	44	28
	Step 7 (PISF) Outlining the structure of the paper	36	20

Apart from the two steps explained in this paragraph, highly-cited research articles are also more inclined to utilise the strategy proposed in the Swales (2004) model of Move 3 compared to the research articles that had never been cited. Move 3 Step 2, Presenting the research question or hypothesis, is found to be the least preferred out of all Move 3 for both citation groups and the step is as proposed CARS model (2004) which is as an optional move. The realisation of Move 3 step 3 Definitional clarifications, for the research articles with zero

citation was higher than the percentage for the highly-cited research articles, are at 20% and 18% respectively suggesting that research articles that had never been cited were more inclined to give definitions in the introduction section.

Apart from the two steps mentioned, the highly-cited research article group also had better accomplishment in presenting the summary of the methods in the introduction section. Conversely, the research articles that had no citation index gave more definitional clarifications compared to the highly-cited research articles. The PISF Steps refer to the steps that are "probable in some fields, but unlikely in others" (Swales, 2004). The three steps are "Announcing the principal outcomes", "Stating the values of the present research" and "Outlining the structure of the paper". The finding on the "Announcement of the principal finding" step showed that the highly-cited research articles were more inclined to adopt this step compared to the other group. The percentage was at 14% and 12%, respectively. The same outcome was observed for the step, "Stating the value of the present research". The highly-cited research articles had a percentage of 44% while the research articles that were not been cited had a percentage of 28%. The percentage difference between the two groups was bigger for this step, indicating the different preference for strategy use between the two groups was more evident for this step. In relation to the promotional strategies explained in the "Materials and Methods" section earlier, the findings from these two steps indicated that the highly-cited research articles were more insistent in promoting the value of the research work and announcing the findings of the study. This way, readers can anticipate the

value and relevance of the research being presented. The research articles that were not cited accomplished this strategy at a lower rate. Many of the articles in this group declared their findings and value of the study. However, the announcement was delayed, appeared later or made in the "Findings and Discussion" section, which is in the latter half of the research article. The CARS model (2004) proposes Move 3 Step 7, "Outlining the structure of the paper" as the last strategy for presenting the research work. This step was also "probable in some fields, but unlikely in others". The highly-cited research articles had a percentage of 36% occurrence whereas the research articles that had never been cited had only a 20% step realisation. The findings also showed that the highly-cited research articles were more assertive in presenting the research work. Apart from presenting the structure of the paper, the research articles in this group also disclosed briefly what the following sections would be on. This way, the reader can anticipate what the research article is about and how relevant the rest of the article is. In addition, the reader can also skip directly to the intended part for reading.

The examination of the corpus in the study showed that the highly-cited research articles were more utilise the strategy proposed in the Swales (2004) model differently from the research articles that had never been cited. Comparisons on the findings also suggested that academicians in Malaysian universities realised this move fairly well; however, more realisation needs to be made in order for their writings to be on par with those of global writers. The findings also stressed the need for writers to be more assertive in promoting their research

work in the introduction paragraph by utilising the "Announcing the principle outcome" and "stating the value of the present research" steps

4.6 Summary on Moves and Steps by Computer Science discipline and Sub Discipline

This section summarizes the findings on Moves and Steps by Computer Science discipline and Sub Discipline (Table 2.28). The analysis of the corpus using the expert view indicates that the research articles identified in the Computer Science discipline research article introductions have higher realization of Moves and Steps compared to research articles singled out as subdisciplines of Computer Science.

Scientists working on same discipline of science share the same norms and expectations regardless of their nationality and language (Okumura, 2003 in Shehzad, 2011), however the findings suggests differently. While the percentage of utilization for Move 1 and Move 2 are almost the same for both groups, the Move 3 is more prevalent in the Computer Science research article introductions compared to the Subdisciplines research article introductions.

All of the Computer Science research article introductions achieved Move 3 whereas only 83% of the research article introductions of the subdisciplines research article introductions make used of this strategy. Move 3 is deemed as obligatory for the Computer Science research article introductions and is considered as an optional move amongst the subdisciplines writers.

On top of that, all of the Computer Science research article introductions also completed the step on 'indicating a move' while only 72% of the subdisciplines research article introductions attempted this strategy.

Table 2.28

Moves and Steps by Computer Science discipline and Sub Discipline

Moves and Steps		Percentages Computer Science	Percentages Sub Disciplines
Move 1	Establishing a territory Topic generalizations of increasing specificity	95	92
Move 2	Establishing a Niche (Citations possible)	100	100
	Step 1A Indicating a gap	70	68
	Step IB Adding to what is known	100	100
	Step 2 Presenting positive justifications (optional)	62	50
Move 3	Presenting the present work	100	82
	Step 1 (Obligatory) Announcing present research descriptively and/or purposively	100	72
	Step 2 (Optional) Presenting RQ or hypothesis	10	8
	Step 3 (Optional) Definitional clarifications	18	18
	Step 4 (Optional) Summarizing methods	80	38
	Step 5 (PISF) Announcing principle outcomes	20	10
	Step 6 (PISF) Stating the value of the present research	42	12
	Step 7 (PISF) Outlining the structure of the paper	60	15

In additional to these differences, 80% of the Computer Science research article introductions summarized the research methods but only 38% of those in the other group undertook this step. Another glaring difference between the two groups are with Move 3 Step 6 and Step 7. Compared to the other group, the Computer Science research article introductions are four times more likely to complete the steps for 'Stating the value of the present research' and 'Outlining the structure of the paper' at 42% and 60% respectively. The subdisciplines research article introductions attempted these respective moves at only 12% and 15%.

In short, the finding indicates that the writers of the research article introductions in this corpus have utilized the main rhetorical strategies which have been suggested in the CARS model (2004), however there are problems with realization of some steps. Other problems were also detected in the micro analysis and were also highlighted by the interviewees. In the next chapter, I will discuss the findings and suggest the Implications and conclusion of the study.

4.7 Linguistic analysis

Transitional words is one of the substance for good writing (Fang, 1996).Besides, the use of transitional words has been reported to support coherence and to establish sequence within and between paragraphs (Gardner, 2003). Appropriate use of transitional words has been notified to contribute to the writing discourse cohesion and coherence. Moreover, students and teachers have reported that their writing skills have improved with more transitional words introduced (Kathpalia & Heah, 2008). Furthermore, language teachers should be provided with a list of commonly used transitional words as a guide to improve the clarity in the writings of English Second Language users (Cameron, 2007). Due to the importance and salient function of transitional words in writing, transitional words have been used as an indicator for linguistic accuracy in writing rubrics (Kobayashi & Rinnert, 1992; Polio, 1997). Following the valuable functions of transitional words in supporting clarity and coherence in writing, this study investigates the high- frequent transitional words used in the corpus by focusing to 1) Identify the transitional words commonly used in Move

1 and Move 2. 2) Describe how the transitional words highlight the sentence to be distinguished as a particular move or step. 3) Indicate the purpose of the transitional words in the particular move or step.

This study investigates the frequently used transitional words in the corpus by focusing to 1) Identify the transitional words commonly used in Move 1 and Move 2. 2) Describe how the transitional words highlight the sentence to be distinguished as a particular move or step. 3) Indicate the purpose of the transitional words in the particular move or step. First, the findings presented are on the most frequently used transitional words in both Move 1 and Move 2. Next, the findings on the frequency of transitional words used according to the Moves and Steps is given. After that, the most frequent transitional words used to realize each move and Step is presented. After the frequencies are presented, the pattern of usage is discussed. The pattern of usage is discussed according to the purpose such as to compare and contrast, to indicate cause and effect and to link ideas. Table 4.29 displays the most frequently used Transitional words for Move 1 and Move 2.

The total number of ten most frequently used transitional words used in realizing Move 1 and Move 2 is 335. The most frequently used transitional words in realizing Move 1 and Move 2 in the corpus is “However” which is utilized 91 times. The next in order are “therefore” at 62, “thus” at 28, “due to” at 28 and “moreover” at 25.

Table 4.29

Most frequently used transitional words in Move 1 and move 2

No	Transitional word	Frequency
1	However	91
2	Therefore	62
3	Thus	28
4	Due to	28
5	Moreover	25
6	While/whilst	23
7	Although	22
8	Since	21
9	Furthermore	19
10	Because/cause	16
	Total	335

The findings in this study concur with Posteguillo (1999) who reports on the frequent use of "however" in expressing the limitation in the research area being studied. On a similar note, Shehzad (2008) also reports that "however" appeared in 62% of the corpus in this study and is used to indicate the research gap. The frequency of transitional words used according to the Moves and Steps is shown in table 4.30

Table 4.30

Frequency of transitional words according to Move and Step

Move/ Step	Frequency
Move 1: Establishing a territory	87
Move 2 Step 1A: Indicating a gap	183
Move 2Step 1B: Adding to what is known	310
Move 2 Step 2: Presenting positive justification	74
Total	654

Table 4.31 shows that the transitional words are most frequently used to realize Move 2 Step 1B "Adding to what is known" whereby 310 transitional words are used. Next, a total number of 183 transitional words is used to accomplish Move

2 Step 1 A "Indicating a gap", followed by 87 for Move 1 "Establishing a territory". Move 2 Step 2 utilized the transitional words for 74 times. The following tables shows the most frequent transitional words used in Move 1, Move 2 Step 1A, Move 2 Step 1B and Move 2 Step 2. Table 4.31 shows the most frequent transitional words used to realize Move 1 "Establishing a territory".

Table 4.31

Transitional words used to realize for M1: Establishing a territory.

No	Transitional word	Frequency
1	However	10
2	Therefore	7
3	Hence	5
4	Although	4
5	Moreover	4
6	In order	4
7	Recently/ In recent	4

Table 4.32 shows a total of 87 transitional words was found in the realization of Move1 "Establishing a territory". The writers used 34 types of transitional words which include "However" which has the highest frequency at 10 occurrences. Other frequently used transitional words are "Therefore", "Hence", "Although", Moreover", "In order" and "Recently/ in recent". The transitional words in Move 1 are used to highlight the increasing specificity of the research territory before moving into the research niche. The first sentence is usually at general level, followed by the second sentence which poses more specificity to the topic of the research and the third sentence links the general topic of the research to the existing body of knowledge as preparation to lead to the niche of the research. It is observed that the transitional words are used to link the

general statements to the specific research and existing body of the knowledge. Even though, 141 research article introductions in the study fulfilled Move 1, the transitional words only occur 87 times. Considering that Move 1 is realized in a few sentences, the frequency of the transitional words for Move 1 is low indicating it as a lesser choice. The frequency is also low when compared to the frequency of transitional words used in realizing the steps in Move 2. Table 4.6 shows the frequency of the transitional words used in realizing Move 2 Step 1A: Indicating a gap.

Table 4.32

Transitional words used to realize M2S1A: Indicating a gap

No	Transitional word	Frequency
1	However	63
2	Due to	13
3	Therefore	12
4	Although	10
5	Since	7

The total number of transitional words used to realize Move 2 Step 1A "Indicating a gap" is 183 with the most frequent transitional word is "however", followed by "due to", "therefore", "although", and "since" respectively. In this step, the writers acknowledge the works that have been done in the area and then proceed to point out the problems concerning the works that have been done. The transitional words such as "however" and "although" are used to highlight the limitations of the existing research and to identify the research gap. The following excerpt illustrates how these transitional words are used to indicate the research gap.

> Many codes have been proposed for OCDMA such as Optical Orthogonal Codes (OOCs) [1], prime codes, and Modified Frequency Hopping (MFH) codes [8]. However, these codes suffer from various limitations one way or the other. (F13UniMAP2)

> …they are potentially good in finding high quality solutions. However, they can be quite inefficient too in the use of computational resources. (UM7)

> Although this successfully decouples the disturbances from the fault reconstruction, it requires very stringent conditions to be fulfilled… (IIUM8)

These excerpts illustrate how the transition words of "However" and "Although" are used to signify the limitations that still exist in the research area. While highlighting the research gap, the link with the existing body of knowledge is maintain. Another transitional word which is highly used is "therefore" which is used to indicate the research gap by highlighting the research problems through presenting the advantage of solving the problem, or through presenting the disadvantage of not solving the problem. In this technique, the writers resort to using the next popular transitional word which is "therefore" as illustrated in the excerpt.

> …the seeds are usually broadcast at random. As a result the corps stand in the field without any specific rows. Therefore, the operation of rotary type rice weeder is not possible and the farmers are compelled to use indigenous hand tools for weed control operation. (1P10)

> …these two pairs of isomers have caused their respective ratios to unexpectedly remain constant and, therefore provide a tracer of PAHs from origin through environmental transport… (1P16)

After presenting the existing research in Move 1, the problems in the research area are pointed out followed by statements relating the need for the problem to

be resolved. At this point, the transitional word "therefore" is used to draw upon the advantage of resolving the problem. Conversely, the disadvantage of not solving the problem may also be presented with the help of the transitional words "therefore". Other transitional words which have been highly used are "due to" and "since". These transitional words are used to emphasize on the reasons or the causes of the problem that lead to the research gap.

> Problems arise due to precise positioning requirements, system flexibility leading to vibration, the difficulty in obtaining an accurate model of the systems… (1P7)
>
> Due to this massive traffic growth and higher axle loads, together with environmental and aging effects, there is a growing concern over rapids deterioration of the pavement (1P3)
>
> Since the total population of these countries is approximately 340 million, a reasonably large number of people use the Jawi script in writing and typing. (2P5)

In this context, the emphasis is on the research gap which is related to the general problem in the research area. The problem is considered general because it is not directly related to the research niche. For example, in excerpt (2P5) the general problem is the big population of the countries which is not a direct problem to the intended research that is on Keyboard layout for Jawi script. However, transitional word "since" has been linked to the general problem of having a big population with the idea of having a large number of people using Jawi. Henceforth, the link provides a research space for Jawi script writing and typing. The transitional word "since" signifies the transition of idea from the general problem into a passage related to the intended research problem. After creating a research space or indicating a research gap, the next step is to focus

on the research niche by giving more information which is related to the specialized area. The step is Move 2 Step 1B "adding to what is known". The following table illustrates the frequency of the transitional words used in realizing Move 2 Step 1B "Adding to what is known". The highest use of transitional word for this step is "therefore" followed by "while/whilst"

Table 4.33

Transitional words used to realize M2S1B :Adding to what is known

No	Transitional word	Frequency
1	Therefore	24
2	While/ whilst	21
3	However	18
4	Thus	15
5	Since	12
6	In addition	12
7	Moreover	12

Move 2 Step 1B is accomplished by giving more information about the research niche, citing the works of others while adding comments to develop the idea cited. It is an important step as it increases the audience acceptability and target community's recognition (Shehzad, 2008:47). The analysis shows that the most frequently used transitional words in accomplishing this step are "therefore", "while/whilst", "however", "thus", "since", "in addition" and "moreover". Even though some of the transitional words such as "therefore", "however", " moreover" and "since" listed for this step are similar to those identified as commonly used in Move 1 and Move 2 Step 1A, the usage of the transitional words in this step is different from those in the other Move and Steps due to the different rhetorical purpose. In the other move and step, the transitional words

are used to highlight the general research topic and indicate the research gap. On the other hand, the transitional words in Move2 Step 1B is devised to link the intended research with the existing research in the niche area. The following excerpts illustrate how the link is established.

> …the labour cost has not only increased substantially but farm labourers have become scarce as well. Therefore direct seedling is practiced extensively and most farmers in the areas are expected to eventually switch to direct seeding so as to reduce the cost of cultivation in some irrigated areas (De Datta and Nantasamsaran, 1991) (1P10)

In excerpt (1P10), the transitional word "therefore" links the general research topic of "labour… increase cost…scarce" to the possible solution of "direct seeding" which is cited from the existing study of "De Datta and Nantasamsaran, 1991". Here, the transitional word "therefore" acts as a linking word, rather than as a transitional word, linking the problem to the existing solution cited.

> Since phase coding was very difficult to preserve in fiber, the technique of SAC with unipolar versions of the same bipolar code was proposed [4].
>
> (F13UniMAP2)

Similarly, in excerpt (F13UniMAP2), the transitional word "since" links the research space of "phase coding was very difficult to preserve in fiber" to the existing solution in the phrase of "SAC with unipolar version" which was cited from the previous study. In short, the transitional words for Move 2 Step 1B are used as a linking device that connects the general research problems and research gap to the existing studies. Likewise, the use of transitional words for Move 2 Step 2 are also different from the use in the other move and steps. The

frequency of the transitional words used in realizing Move 2 Step 2 "Presenting positive justification" is presented in Table 4.34

Table 4.34

Transitional words used to realize M2S2: Presenting positive justification

No	Transitional word	Frequency
1	Therefore	21
2	Hence	10
3	Thus	7
4	In order to	4
5	Because	3

Move 2 Step 2 "Presenting positive justification" is where the research gap that has been highlighted is retained and claimed. Statement on the intention to occupy the research space is made however, only 62% of the corpus attempted this step. Respectively, the frequency of the transitional words used for this Step is also the lowest at 74 with "therefore" being the highest followed by "hence" , "thus", "In order to" and "because". Similar to the other move and Steps, "therefore" is also listed as the common transition word for this step. However, the transitional word "therefore" in this step is used to emphasize the justification on why the study is necessary. Often, after the research gap is reasserted, the transitional word "therefore" is used in the claim on the research space by highlighting the benefit of the study or by giving the drawbacks of not having the study. The following excerpt illustrates the use of the transitional word "therefore" for Move 2 Step 2.

> The conventional load shedding techniques may not work as desired in emergency conditions due to the complexity and size of modern power systems. Therefore, alternative methods are required for solving certain

> difficult power problems where the conventional techniques have not achieved the desired speed and accuracy.
>
> (F7UMP1)

In the excerpt (F7UMP1) the transitional word "therefore" links the research problem to the justification for the study. The research problem of "conventional load shedding techniques may not work" is highlighted and then, the claim on the research space is made in "solving certain difficult power problems". The transitional word "therefore" creates a link between the research problems by justifying the need for the intended study. While the transitional word "therefore" is used to justify the need for the study, the same word "therefore" in Move 2 Step 1B is used to elaborate on the existing research in the area. The usage may seem similar that is as a linking device but then again the rhetorical purpose differentiate the usage.

In short, transitional words are devices that bridges the development of the ideas. The transitional words are also cues that help the readers to interpret the research better. Because transitional words device link within sentences and paragraphs, it is important to understand how the transitional words form the relationship as they are used in each Move and Step.

4.8 Patterns of usage for Transitional words

The patterns of usage for the ten most frequently used transitional words can be categorized into three categories, namely to compare and contrast, to indicate

cause and effect and to link ideas. The patterns of usage is shown in the following table.

Table 4.35

Pattern of usage

No	Transitional word	Frequency	Usage patterns
1	However	91	To compare and contrast
6	While/whilst	23	To compare and contrast
7	Although	22	To compare and contrast
2	Therefore	62	To indicate cause and effect
3	Thus	28	To indicate cause and effect
4	Due to	28	To indicate cause and effect
10	Because/cause	16	To indicate cause and effect
5	Moreover	25	To link ideas
8	Since	21	To link ideas
9	Furthermore	19	To link ideas

The transitional words that are most used to compare and contrast are "However", "While/whilst" and "Although". Within this category, four usage were observed. The usages are by indicating limitation in the research area, by suggesting a problem in the existing research area, by presenting a research opportunity and by suggesting for an extension on the works of others. The first excerpt describes the use of "however" in indicating the limitation in the research area thus proposing critical view on the previous research.

> Many codes have been proposed for OCDMA such as Optical Orthogonal Codes (OOCs) [1], prime codes, and Modified Frequency Hopping (MFH) codes [8]. However, these codes suffer from various limitations one way or

> another. The codes' constructions are either complicated (e.g., OOC and MFH codes), the cross-correlation are not ideal (e.g., Hadamard and Prime codes), or the code length is too long (e.g., OOC and Prime code).
>
> (F13UniMAP2)

Writers of (F13UniMAP2) acknowledged the works that have been done in the area by stating "...Many codes have been proposed for OCDMA such as Optical Orthogonal Codes (OOCs) [1], prime codes, and Modified Frequency Hopping (MFH) codes [8]" (lines 1-2) Next, the writers compare and contrast the existing works to the limitation in the works that have been done by previous researchers as being "complicated" (line 6), "not ideal" (line 7) and "code length is too long" (line 9).

The use of transitional word "However" (line 4) is used to compare and contrast previous works by giving a critical view on works by stating "However, these codes suffer from various limitations one way or another". The following sentence elaborates on the "various limitations" suffered. In this strategy, "however" is being used to indicate the limitation of the research area followed by a critical view on previous research done in the area.

Another example on using transitional word to indicate the limitation of the research area is presented in the following excerpt (UM4).

> While effects of the cigarette smoke on proteins expressed in the bronchoalveolar lavage [36–38], nasal lavage fluid [39], urine [40], lung tissue [41], bronchial airway epithelium and pooled exhaled breath condensate samples [42] have been analyzed, little information is available regarding the effects of smoking on the whole saliva proteome.

(UM4)

In this example (UM4) the writer indicates the limitation of the research. First the writers acknowledge the existing analysis done on "the bronchoalveolar lavage [36–38], nasal lavage fluid [39], urine [40], lung tissue [41], bronchial airway epithelium and pooled exhaled breath condensate samples [42]". Next, the use of "while" signals the limitation of the research which is conveyed in "little information is available regarding...". As such the limitation of the research has been conveyed.

The next usage reveals the problems of the research. This is achieved by using transitional word "however" that compare and contrast the existing research followed by a preposition that there are problems in the research area. In this strategy, the word "however" is used in drawing attention to the problems in the research area. The example is quoted below:

> By basing on the description of the traffic patterns, the control system is made adaptive, resulting in adjustment in the hall call assignment strategy. However, these approaches were heavily dependent on the accuracy and correctness of traffic pattern predictions. (UM7)

In UM7, the transitional word "however" is used to highlight on the research problem of "approaches were heavily dependent on the accuracy and correctness". The difference between this usage and the previous usage in (F13UniMAP2) is that this usage focuses on the particular research problem instead of highlighting the limitation of the research area. The next excerpt also illustrates on the use of transitional word "however" in pointing out the research problem.

> DPR has been widely studied in various fields [4–18]. However, current DPR design flows and implementations are not capable to provide a set of programs to establish communication between the FPGA and host computer. (F2UTHM)

The writers of F2UTHM acknowledge the works that have been done in the field "DPR has been widely studied in various fields" and listed the citations "[4-18]".

Next, the comparison on the previous work is conveyed in the suggestion that problems still exist in the research area. The transitional word "however" highlights the problem of the existing research which is "current DPR design" as being "not capable to provide…" This suggests that the pattern of usage for this transitional word "however" is to compare and contrast the existing research with the potential problem that still exists in the area. The following excerpt (UM7) also illustrates how the transitional word "however" is used to highlight the existing problems

> "...they are potentially good in finding high-quality solutions. However, they can be quite inefficient too in the use of computational resources." (UM7)

In the excerpt (UM7) the writer also compare and contrast the existing research work with the problem that still exist in the research area. Similar to the previous excerpts, the writer acknowledges the existing research as being "potentially good in finding high-quality solutions". And then, the transitional word "however" highlights the problem of "they can be quite inefficient". Again, the pattern of compare and contrast emerge as a way to indicate the problem by using the transitional word "however".

In excerpt F13UniMAP2, the writers also highlight the problem in the previous research.

> Saif & Guan [13] aggregated the faults and disturbances to form a new 'fault' vector and used a linear unknown input observer to reconstruct the new fault vector. Although this successfully decouples the disturbances from the fault reconstruction, it requires very stringent conditions to be fulfilled… (IIUM8)

In the excerpt (IIUM8) the writers have acknowledged the works that have been done in the area by stating "...this successfully decouples the disturbances from the fault reconstruction..." and then proceeded to point out the problems concerning the works that have been done by the previous researchers as in "it requires very stringent conditions to be fulfilled, and is conservative because the disturbance does not need to be reconstructed, only rejected/decoupled" (lines 4-7). Again the transitional word "Although" has highlighted the contrast between the two ideas in the sentence. The act of pointing out the unresolved problems despite the previous research done has effectively signified the research gap.

Other used of transitional word that compare and contrast is to highlight the opportunity for further research. The following excerpt illustrates how this is done.

> Typically, WI(Writer Identification) is performed on level papers by means of signature. However, it can also be necessary to recognize the handwritten authorship without signature, such as in case of threatening let-ter, (sic) authorship determination of an old or historical manuscript." (F6 UTEM2)

The writers of this excerpt (F6UTEM2) reveal the opportunity for further research with the use of transitional word "however". Similar to the other excerpts, the writer starts with acknowledging the work that has been done in the research area as in "Typically, WI (writer Identification) is performed on level

papers by means of signature." But in this usage, instead of highlighting the problem and the limitations, the opportunity for further research is conveyed in "However, it can also be necessary to recognize the handwritten authorship without signature" followed by examples of the opportunity. The transitional word "however" functions to compare and contrast the existing research with the possible opportunities.

Another use of "however" is by suggesting for an extension on the works of others. Similar to the previous usage, the works of others are mentioned first and then, the extension on the present work is suggested. The following excerpt illustrates the usage.

> Existing works in WI concentrate on feature extraction and classification task in order to identify the handwritten authorship. However, additional steps need to be performed in order to have a better representation of input prior to the classification task. (F6 UTEM2)

In this example (F6 UTEM2) the works of others are mentioned first as in "Existing works in WI concentrate on", and then, extension for additional study is suggested as in "However, additional steps need to be performed in order to have a better representation".

Unlike the previous usage, the inadequacy in the previous study is not identified, instead, the merits of further research is presented. This technique is also detected in the corpus studied by Shehzad (2008). The research gap can also be from "the extension of the author's previous work" (Shehzad, 2008:34).

In summary, the transitional word that function to compare and contrast such as "However", "While" and "Although" are used for various usages. Four usage

has been identified which are to indicate the limitation of the research area, to highlight the existing research problems, to reveal the research opportunities and to suggest for an extension on the present work. In using this function, all usage begins with acknowledging the research done in the research area. And then, using the transitional words, the limitation, research problem or research opportunities are presented.

The next pattern identified for the most used transitional words is to indicate cause and effect. The words that are most frequently used to indicate cause and effect are "Therefore", "Thus", "Due to", "Because/cause". For this pattern, two ways of usage were observed. The first one is to elaborate on the problem of the study and the second one is to give justification on the need for the study.

In the first usage, the transitional word is used to elaborate on the problem of the study. The problem in the research area is presented and then, the effect of the problem is revealed thus providing the reader with more elaboration on the roots and effects of the problem. The following excerpts illustrate the usage in this context.

> …the seeds are usually broadcast at random. As a result the corps stand in the field without any specific rows. Therefore, the operation of rotary type rice weeder is not possible and the farmers are compelled to use indigenous hand tools for weed control operation. (1P10)

The root of the problem is that the seed are broadcast at random, leading to another problem of not having "any specific row". Next, the transitional word "therefore" signals the movement of idea from the cause to the effect. The cause of the seed "broadcast at random" and the corps not having "specific rows" is

linked to the effects of these two problems is that "it is not possible" to use the machine so the farmers have to use their hands to control the weed in their rice field. The cause and effect of the problem is highlighted and explained. The transitional word "therefore" is used to elaborate on the problem of the study.

The next usage for the transitional word of cause and effect is to give justification on conducting the study. In justifying the need for the study to be conducted, writers often explain the problems in the research area and then present the reason for the study to be conducted. Transitional words that indicate cause and effect are used to highlight the reason and motivation for the study to be done. The motivation for the study is explained by presenting the advantage of resolving the problem, conveying the need for challenge to be resolved, or cautioning on the disadvantage of not solving the problem.

The following quote (FUUTHM1) illustrates on the way the transitional words is used in justifying the study by presenting the advantage of resolving the problem.

> With this technique, the complexity is however still an issue due to all attributes are considered to obtain the clustering attribute. Therefore, there is a need for a technique in data clustering to improve the accuracy and computational complexity (F1 UTHM1)

In this excerpt (F1 UTHM1) the problem of the "complexity" being an "issue" is presented. And then, the use of "therefore" signals the cause and effect of the problem highlighted. The writers suggested "a need for a technique" and proceeded to suggest the advantage of meeting the need which is "to improve the accuracy and computational complexity".

The transitional word "therefore" has been used to signal the transition from the problem to the advantage of having the problem solve thus served the purpose of justifying the intended study. The following excerpts also illustrate how transitional word is used in justifying the study is by giving the advantage of conducting the intended study.

> The conventional load shedding techniques may not work as desired in emergency conditions due to the complexity and size of modern power systems. Therefore, alternative methods are required for solving certain difficult power problems where the conventional techniques have not achieved the desired speed and accuracy. (F7UMP1)

In the excerpt (F7UMP1) the transitional word "therefore" links the research problem with the justification for the study. The research problem of "conventional load shedding techniques may not work" is highlighted and then, the advantage of claiming on the research space is made in "solving certain difficult power problems". The transitional word "therefore" creates a link between the problems of the study with the advantage for the intended study.

Another use of transitional word "therefore" in justifying the need for the study is by conveying the need for the challenge to be resolved. Unlike the previous usage, the advantages is not mentioned, instead the necessity for a solution to the problem is emphasised. This usage is explained using the following excerpts (IIUM3)

> Aedes mosquito rests inaccessible areas behind the human dwellings; hence, the collection of these mosquitoes by hand catch is very difficult. However, the adult mosquitoes are being collected by either man-biting/landing or netting. These methods are considered as *unethical issues* for measuring the adult population. Therefore, *attempts are being made* to collect these mosquitoes through *different types of traps* developed by different companies

IIUM3

In the example above (IIUM3), the problem of "unethical issues" in relation to collection of samples is highlighted. In the last sentence, the transitional word "therefore" signals the justification for the study in the statement that hinted "attempts are being made" to solve the problem using various "types of traps". The transitional word "therefore" signals the transition of idea from the problem of "unethical" to the necessity of having "different types of traps"

The next usage for the transitional word of cause and effect is to give justification on conducting the study by revealing the disadvantage of not doing the study. The excerpt below (USM1) illustrates on how this usage has been carried out.

> The contamination of digital image by salt-and-pepper noise is largely caused by error in image acquisition and/or recording. For example, faulty memory locations or impaired pixel sensors can result in digital image being corrupted with salt-and-pepper noise [1]. The need to remove salt-and-pepper noise is imperative before subsequent image processing tasks such as edge detection or segmentation is carried out. This is because the occurrence of salt-and-pepper noise can severely damage the information or data embedded in the original image.

(USM1)

In the excerpt (USM1), the niche of the study is "Salt-and-Pepper Noise reduction" since the title of the research article is "Noise Adaptive Fuzzy Switching Median Filter for Salt-and-Pepper Noise reduction". The first sentence of the quotation indicate the research gap by highlighting the problems related to "salt-and-pepper noise".

Next the gap is asserted further by using examples to add more information on the topic. The need for the study is conveyed in "The need to remove salt-and-pepper noise is imperative" and further emphasised by cautioning on the down-side if the problem is not solved as in "This is because the occurrence of salt-and-pepper noise can severely damage the information or data". The transitional word of cause and effect "because" is used to emphasis the damage which may result from the problem.

The last pattern identified is on the transitional words that are used is to link ideas. The transitional word that are frequently used for this are "Moreover", "Since" and "Furthermore". The following excerpts illustrate how the link is established. The transitional words are used to link ideas by adding more information to the statement mentioned earlier. In this usage, the writers often supplement the information cited in the previous research with original comments and ideas. The following excerpt (F14UUM1) illustrates the usage

> Generally, an ambiguous definition of user requirements occurs because the users are unable to define the requirements precisely and clearly [1]. Moreover, various meaning of data (i.e. attributes tables) makes it difficult for integrating the user requirements to the data sources.
>
> (F14UUM1)

In this excerpt (F14UUM1), the information from the cited work is presented. The information is actually a problem of "ambiguous definition of user requirements" which "occurs because" of some given reason cited from a previous work. Transitional word "moreover" is used to link the problem of "ambiguous definition of user requirements" with another reason which is

"various meaning of data". The first reason is from a cited source and the second reason is from the writers themselves. Using the transitional word "moreover", the link between the two reasons is established by linking the ideas by adding more information to the statement mentioned earlier

Another transitional word used to link ideas is "Furthermore". It is used to link ideas by adding more information to the statement mentioned earlier. The following excerpts illustrate the usage

> The evaluation result could become biased as it is almost like based on human perception. Furthermore, humans are prone of doing mistakes.
>
> (F4UMP4)

Similar to the usage for "moreover" the first reason to the problem is linked to the next reason of the problem using the transitional word. In this excerpt (F4UMP4), the problem is "The evaluation result could become biased" the first reason given is because the evaluation is "almost like based on human perception". Using the transitional word "Furthermore", the supporting reason of "human are prone of doing mistakes" is linked to the problem which is "evaluation result become biased"

The transitional words are used to highlight limitation of the research, indicate the research problem and justify the reason to conduct the study. Whereas, some of the transitional words are used to link the intended research with the existing research in the niche area.

In short, Transitional words are devices that bridge the development of the ideas. The transitional words are also cues that help the reader to interpret the

research better. Because transitional words devices link within sentences and paragraphs, it is important to understand how the transitional words form the relationship as they are used in each Move and Step.

CHAPTER FIVE

DISCUSSION AND RECOMMENDATIONS

5.1 Overview

In this chapter, the research question stated in Chapter One is addressed. The first question is what are the move and steps typically found in the research article introduction in Computer Science discipline that are written by academicians in Malaysian universities? The general findings on 3 moves and 11 steps of the corpus are discussed by comparing the findings of this study with the findings from the other studies in the context of research article introduction written by writers with no specific nationality and studies on research articles written by non-native writers. Next, the discussion progresses by answering the second question on, to what extent do the academicians in Malaysian universities conform to CARS model (Swales, 2004) in writing Computer Science research article introduction. The discussion on the application of CARS model and emended CARS model for Computer Science research article proposed by Shehzad (2012) produce a pattern that describe the move application and the techniques found in this study. The discussion is followed by the implication and limitation of the study and finally ends with recommendations for future research.

5.2 Discussion on Research Question 1

RQ1. What are the move and steps typically found in the research article introduction in Computer Science discipline that are written by academicians in Malaysian universities?

5.2.1 Discussion on Move 1: Establishing a territory

The start the discussion, the general findings on the move and steps of this study are discussed by comparing the findings with those found in the other studies in the context of research article introduction written by writers with no specific nationality and studies on research articles written by non-native writers. It is important to understand that many of the studies prior to 2005 are done using CARS model (Swales, 1990) which has listed three possible steps for Move 1 namely *claiming centrality*, *making topic generalization* and *reviewing items of previous research.* In the later version of CARS model Swales (2004) summated the three steps into one Move. The move proposed in 2004 version is Move 1: *Establishing a territory* which necessitates for *requires citation* and is realized by making *topic generalizations of increasing specificity.* With regards to the two versions of the model, the discussion for this study focuses on the recent version of CARS Model (Swales, 2004). This study discussed move 1 in summation without advancing into the three steps. The following table 5.1 shows the percentages of occurrence for Move 1 *establishing a territory* found in previous studies.

Table 5.1

Move 1 comparison on writers with no specific nationality

Moves and Steps	**This study Malaysian writers**	**Writers with no specificity to nationality**	
		(Shehzad 2012)	**Anthony (1999)**
Move 1 Establishing a territory	94%	95%	97%
Topic generalizations of increasing specificity	Obligatory	Obligatory	
Citation required	85%	93%	100%

All of the studies conducted in the table above have Computer Science research article as the corpus. The findings shows that 94% of the research articles in this study have utilized *establishing a territory* as an obligatory move however, the *citation* used for this move is underutilized.

The findings of this study on *establishing a territory* concurred with other studies (Anthony, 1999; Shehzad, 2012) that *establishing a territory* is an obligatory move. Anthony (1999) found 97%, and Shehzad (2012) found 93% of occurrences in their studies on Computer Science research articles introductions thus suggests that the utilization of *establishing a territory* in this study is at par with those written by the international writers reported in the two studies. In addition, comparing the findings of this study with the other studies also suggests that *establishing a territory* is an obligatory move in research article introductions in any research discipline. Samraj (2002) in the study on

Wildlife Behaviour and Conservational Biology, Sheldon (2011) in the study on Applied Linguistics both reported on 100% occurrences for this move; while Briones (2012) in the study on articles in the field of Philosophy reported 86.66% occurrence. The reason is that research articles of any discipline need to address the general audience before going deeper into the research niche and this confirms the suggestion made in CARS model (Swales, 1990, 2004).

However, the citation percentage of 85.3% found in this study indicates that the *citation* is utilized as an optional step instead of as an obligatory step as suggested in CARS model (2004). The percentage is also is lower from those found in the other studies on Computer Science research article (Shehzad, 2012; Anthony, 1999). Shehzad (2012) reported Move 1 citation at 93% and Anthony (1999) found 100% occurrences. The lower percentage indicates inadequacy of citation in *establishing a territory* among academicians in Malaysian university. Even though the interviews indicated that the writers are aware of the importance of citation, the low percentage indicates that citation in establishing a research area for this group needs to be reinforced in practice. Analysis on the citation also shows that 36% of the citation has been delayed and some of the writers totally omitted citation for this move. The citation establish a link between the research article and the existing research area consequently; having this step delayed or missed hinders the establishment of the link. Given the importance, CARS model (Swales, 2004) has proposed that citation for this Move is a required step. In that, more citation in Move 1 is preferred to comply with the expectation of the wider culture.

When compared to the findings of the studies on research articles written by non-native writers (Briones, 2012; Safnil, 2013; Sheldon, 2011) in table 5.2, the utilization of *establishing a territory* is also at par.

Table 5.2

Move 1 comparison on research articles written by non-native writers

Moves and Steps	**This study Malaysian writers**	**Non-native writers Briones (2012) (Philippines)**	**Sheldon (2011) (Spanish)**	**Safnil (2013) (Indonesian)**
Move 1 Establishing a territory	94%	86.66%	100%	100%
Topic generalizations of increasing specificity	Obligatory			
Citation required	85.%	63.33%	NA	NA

Briones (2012) found 86.66% of realization for this move in his study on research article introduction in the field of Philosophy written by the writers in a university in the Philippines. Sheldon (2011) found 100% occurrences in her corpus of Applied linguistic and Safnil (2013) also found 100% occurrences in his corpus of science research articles. The comparison shows that in *establishing a territory*, the practice of the writers in study is similar to the other non-native writers in the three studies which is in line with CARS model (Swales, 2004).

In short, the findings suggest that the utilization of *establishing a territory* by the writers in this study is at par with the international Computer Science writers and the non-native writers in the other studies (Anthony, 1999; Briones, 2012;

Safnil, 2013; Shehzad, 2012; Sheldon, 2011). The finding also concur that *establishing a territory* is an obligatory move in research article introductions in any research discipline and in research articles introductions written by non-native writers. However, even though *establishing a territory* has been utilized as obligatory strategy in the research article introductions on this study, the utilization of citation has been delayed or even totally omitted. Therefore, more citation in Move 1 is preferred to comply with the expectation of the wider culture.

5.2.2 Discussion on Move 2: Establishing a niche

Move 2 *establishing a niche* is found in all the research article introductions of this study and comparison with the findings of the previous research confirm that this Move has emerged as a trend. This study concurred with Shehzad (2008) that *establishing a niche* is a growing trend and has become an obligatory move in Computer Science research article discipline. Table 5.3 shows comparison of *establishing a niche* with Computer Science research article introductions written by writers with no specificity to nationality. In 1999 Posteguillo (1999) reported an occurrence of 57% while the percentage is at 91.7% in a study also done in 1999 by Anthony (1999), then in 2008 Shehzad reported an increase to 94.64%, and finally in this study a 100% utilization is found.

Posteguillo (1999) associated the low percentage to Computer Science discipline being a new discipline relative to that particular time. Even though in the same year Anthony (1999) found 91.7% of occurrence, Anthony's (1999) corpus

examines research articles which have received "Best paper" awards while Posteguillo (1999) looks at 40 research articles from three journals.

Table 5.3

Move 2 comparison on writers with no specificity to nationality

Moves and Steps	**This study Malaysian writers**	**Writers with no specificity to nationality Shehzad (2012)**	**Posteguillo (1999)**	**Anthony (1999)**
Move 2 Establishing a Niche (Citations possible)	100% Obligatory	93% Obligatory	NA	NA
Step 1A Indicating a gap	73% Optional (Underutilised)	95% Obligatory	57.5%	91.7%
Step IB Adding to what is known	99%Obligatory	NA	NA	NA
Step 2 Presenting positive justifications (optional)	62%Optional	NA	22.5%	50%

The better quality paper must have been the reason to why Anthony (1999) found more realizations than Posteguillo (1999). Even so, both studies have lower occurrences than the study conducted by Shehzad (2008) which was done almost ten years later. More researches has been published within the ten years, consequently more references were available thus making this move easier to be accomplished. Since the study by Posteguillo (1999), The Computer Science research area has become more established and more robust hence the competition to place the intended study in the attention of the research community has escalated. This study concurred with Shehzad (2008, p.28) that *establishing a niche* is "a growing trend". The growing competition and robustness of the discipline has increased simultaneously hence supports the

trend of *establishing a niche* utilization. Later in 2012, Shehzad (2012) proposed *establishing a niche by indicating a gap* as an obligatory Move for Computer Science discipline in the Model for CS RA Introduction.

However, while 100% of the research article introduction in this study utilized the move on *establishing a niche* only 73% of the research article introduction indicate the research gap. The low percentage suggests that this step is used as an optional step instead of as an obligatory step as suggested in CARS model (Swales, 2004) and "Model for CS RA Introduction" (Shehzad, 2012, p.29). *Indicating a gap* entails the writer to recount the research area and point out the research space which exists in the body of research. The writer tries to convince that the research space revealed requires further investigation and worth studying. The act of indicating a gap is described as builds up a demand for current contribution (Shehzad, 2008). The percentage found in this study is also lower than those reported in Anthony (19990 at 91.7% and in Shehzad (2012) at 95%. However it is higher than the percentage found in the study by Posteguillo (1999) at 57.5% which reason could be attributed to limited literature available because Computer Science was a new field during the time of the study by Posteguillo (1999). Given the importance and the acceptance by the international Computer Science writers, more attempts on *indicating a gap* is required in order to comply with the expectation of the notable conventions.

Despite being underutilized, the writers in this study are found to have used four techniques to *indicate a gap.* The techniques are by indicating the limitation in the research area, by suggesting a problem that needed to be solved, by

conveying the suggestions of research made by previous researcher, by extending the works of others.

Next, the findings in this study show all of the research article introductions in this study fulfilled Move 2 Step 1B *Adding to what is known* making this step as an obligatory step as suggested in CARS model (Swales, 2004). It is the most prevalent step and three techniques on how this step is achieved by the writers are found. The techniques are by giving information and ideas with no citation, by adding comments and ideas to the cited work and by developing the idea from the cited work via adding other cited work.

The last step which is *presenting positive justification* has been realized as an optional strategy at 62%, similar to the suggestion in CARS model (Swales, 2004). This step is where the research gap highlighted previously is being claimed and statement on the intention to occupy the research space is made. Even though the percentage is lower compared to the other move and steps mentioned earlier, five techniques on how this step is realized are found. The techniques found are direct justification on the need of the study, direct justification on the benefit of the study, indirect justification by giving drawbacks of not having the study, embedded in Move 3 and by using combination of the mentioned techniques.

Even though Shehzad (2008) and Briones (2012) have written extensively on Move 2 *establishing a niche* of CARS model, their reports on realization of *establishing a niche* are focused on Step 1A *indicating a gap* which is on how

the research gap is highlighted rather than explaining on how the step of *Adding to what is known* and *presenting justification* are made. Therefore, the findings of this study on the techniques of realization for the all steps in Move 2 *establishing a niche* may add some information on how this move can be used by the writers. The excerpts found to illustrate the techniques may also be used as authentic example in pedagogical application.

Next, the discussion is the next step which is *Recycling.* The findings show 96% of the research article introductions in the study used this strategy, indicating that this strategy is generally accepted by the writers. There is limited discussion on the importance of Recycling as most research in research article introductions focus on the accomplishments of the Moves and Steps (Atai & Habibie, 2009; Dong & Xue, 2010). Moreover, *recycling* is a newly added step in CARS model (Swales, 2004) therefore the realization percentage are not available in the previous studies on Computer Science research article introductions done prior to CARS model 2004. Even though the percentage of realization is not available for comparison, this step is discuss further in the next section 5.2.2.1 in the context of non-native writers.

5.2.2.1 Discussion on Move 2: Comparison on research articles introductions written by non-native writers

Next, the discussion on Move 2 *establishing a niche* compares the findings of this study with the findings of previous studies on research articles written by non-native writers of English (Briones, 2012; Safnil, 2013; Sheldon, 2011). Shehzad (2011) stated that scientists working on same discipline of science

share the same norms and expectations regardless of their nationality and language, however studies on English research articles written by non-native writers have indicated that some cultural variation may have seeped through the scientific writing (Adnan, 2009; Briones, 2012; Safni,2013). Table 5.4, the utilization of *establishing a niche* indicates some differences that call for a consideration on the suggestion of cultural variation in the writing of research articles. After the reflection, the discussion concludes that while the cultural variation may be a reason in the underutilization of some steps, the research article writers share the same expectation and therefore more attempts in realizing the moves is preferred.

Table 5.4

Move 2 comparison on research articles written by non-native writers

Moves and Steps	**This study** **Malaysian writers**	**Non-native writers** **Briones (2012) (Philippines)**	**Sheldon (2012) (Spanish)**	**Adnan (2009) (Indonesian)**	**Safnil (2013) (Indonesian)**
Move 2 Establishing a Niche (Citations possible)	100% Obligatory	91.7%	77.77%	Education 14.28% Linguistic 38.09% Socio political Science 42.85%	56.66%
Step 1A Indicating a gap	73% Optional (Underutilised)	23.33%	94.44%	NA	16%
Step IB Adding to what is known	99% Obligatory	NA	33.33%	NA	NA
Step 2 Presenting positive justifications (optional)	62%Optional	NA	22.2%	NA	NA

Only 73% of the research articles in the study attempted to indicate the research gap indicating that this step is deemed as an optional strategy instead of obligatory as suggested in CARS model (Swales, 2004) and "Model for CS RA

Introduction" (Shehzad, 2012, p.29). Briones (2012), and Safnil (2013) who have conducted similar studies on Philippines and Indonesian writers respectively also indicated that the research gaps are non-prevalence in the research articles of their study at 23.33% and 16% respectively.

However, Sheldon (2011) who conducted a study on research articles written by Spanish writers found 94.44% realization in her corpus. Nevertheless, compared to the native English writers, the Spanish writers showed "a weaker version" of this step hence rendering the introduction section to appear "flat". (Sheldon, 2011, p. 245).

Ahmad (1997) in the study on research articles written in Malay language also found the similar shortcoming with realization under 35% reasoning that it is typical for the writers of the Malay research article to dismiss this strategy or simply avoid using this strategy. Similarly, studies on the research articles written Thai also report on the avoidance of the step with 66.66% occurrence. (Kanoksilapathnam, 2005). The common reason given by the researchers is the small size of the research community (Ahmad, 1997; Briones, 2012; Sheldon, 2011). In writing English research articles by the Spanish writers, Sheldon (2011) reasoned that the Spanish writers "resist criticising previous studies" because of the small research community size where the writers are "very likely to know the key members of the community". The small research community size is also given as the reason for the Thai writers to avoid this strategy (Jogthong, 2001:83). It was justified further as to "save face" and to respect the "system of seniority" making it "inappropriate to criticize the works of their

colleagues" instead the Thai writers are said to "prefer to elaborate the problem" letting the audience "evaluate and make their own decision" (Jogthong, 2001:83).

In relation to this study, the explanation of small research community size given in the studies (Jogthong, 2001; Sheldon, 2011) does not seem to fit. For one reason, when writers submit the research articles to an international journal, the audience and readership is more global. The writers have the choice to comment the works of other researchers beyond the local research community. The writers can still preserve the culture of "saving face" by avoiding the local key research member and instead, examine the works of other researchers in the other part of the world. The research articles in this corpus also avoid criticizing the work of other researchers, instead of accomplishing the research gap by criticizing the work of other researchers, the academicians in Malaysian universities prefer to portray the research gap by indicating the limitation of the previous researches, suggesting problems that needed to be solved, conveying the suggestions of research by previous researchers and extending the works of others.

In short, the difference Given that the Therefore this study concurs with Shehzad (2011) that scientists working on same discipline of science share the same norms and expectations regardless of their nationality and language,

The findings show 96% of the research article introductions in the study used this strategy, indicating that this strategy is generally accepted by the writers. This study proposed that the high realization of Recycling by the writers is due

to the importance on reinforcement and the assertiveness of Move 2 *establishing a niche*. Repetition has been reported to be quite prevalent among the Arab writers and the reason given was that in the Arabic prose, the "repetitions is the principle text building strategy" and it is a common practice for opinions to be reinforced through repetition (Fakhri, 2004). Similar strategy is being applied in the iteration of *establishing a territory* and *establishing a niche*. Recycling interjects and reinforces the iterative realization of *establishing a territory* and *establishing a niche* into more specific topics consequently establish more assertive research niche. With each recycling, the topic gets more specific to the intended study thus most writers in this study attempted this strategy.

5.2.3 Discussion on Move 3: Presenting the present work

The discussion on findings for Move 3 *presenting the present work* is on the lack of preference to utilize this move. And then the discussion proceeds to examine each of the 7 steps in Move 3 by comparing the findings of this study with those found in the other studies in the context of research article introduction written by writers with no specific nationality and studies on research articles written by non-native writers.

In this study, 91% of the research article introductions utilized Move 3 suggesting this Move as an obligatory strategy in line with the suggestion in CARS model (Swales, 2004). The findings show 9% of the research article introduction did not use this step and the avoidance is owed to two reasons.

Table 5.5

Move 3 comparison on writers with no specific nationality

Moves and Steps	This study Malaysian writers	Writers with no specificity to nationality Shehzad (2012)	Posteguillo (1999)	Anthony (1999)
Move 3 Presenting the present work	91% Obligatory	NA	100%	100%
Step 1 (Obligatory) Announcing present research descriptively and/or purposively	86% Optional (Underutilised)	98% (Obligatory)	95%	41.7%
Step 2 (Optional) Presenting RQ or hypothesis	1% Optional	32% Optional	22.5%	0%
Step 3 (Optional) Definitional clarifications	17% Optional	NA	NA	NA
Step 4 (Optional) Summarizing methods	53% Optional	NA	NA	NA
Step 5 (PISF) Announcing principle outcomes	15% Optional (Underutilised)	73% (Obligatory)	70%	75%
Step 6 (PISF) Stating the value of the present research	35% Optional (Underutilised)	55% (Obligatory)	NA	100%
Step 7 (PISF) Outlining the structure of the paper	34% Optional (Underutilised)	86% (Obligatory)	70%	83%

The first one is because of the non-experimental nature of the research article and secondly it is because the move has been delay to the later sections of the research articles.

The 14 research articles that did not use of Move 3 *Presenting the Present Work* is due to the nature of the research article which is non experimental and more of being conceptual or review. It was found that conceptual or review articles in this corpus avoid presenting the intended study. The descriptions or purposes of the research article were also vague. Swales (2004, p.232) has emphasized that

"in appropriate circumstances, early positive evaluations, early justifications and early clarifications can work to both impress and reassure the reader that the paper is worth pursuing further". It is understandable that the principle outcomes and the methods are not mentioned, but the lack of description on the intended writing in the introduction and the absence on the value of the research results in ambiguity on what to expect.

Next, this discussion proceeds to examine each step based on the findings that all of the steps in Move3 are used at Optional level, even when Swales (2004) and previous studies indicated that some of the steps should be obligatory.

5.2.3.1 Discussion on Move 3 Step 1 Announcing present research

Findings on Move 3 Step 1 *Announcing the present research* occurred in 86% of the research article of this study and the step is deemed as an optional step. However this step is suggested as an obligatory step in CARS model (Swales, 2004). The findings suggest that the Malaysian writers are employing this step at a lower rate than expected where studies on Computer Science research articles found 95% realization (Posteguillo, 1999) and 98% realization (Shehzad, 2012) (see Table 5.5). *Announcing present research* is found to be realized using the following four techniques; announcing the present research descriptively, announcing the present research purposively, using research objectives, by embedding the announcement into other steps in Move 3.

5.2.3.2 Discussion on Move 3 Step 2 Presenting Research questions

In this study, *presenting Research Question* is the least preferred step and only one research article in the corpus attempted this step therefore it is suggested

that this step is taken out from the rhetorical structure description for Computer Science research article introduction of this study. This study is in agreement with the other studies that there is limited utilization of this step in the research articles. For computer science discipline, Anthony (1999) reported that no attempt was made on using this step in the best paper corpus, Posteguillo (1999) reported on 22.5% occurrence and Shehzad (2012) found 32% if occurrence. Because of the low utilization found in this study and the low occurrence in the other studies in Computer Science discipline, this study proposed that this step is taken out from the description for the corpus of this study.

5.2.3.3 Move 3 Step 3: Definitional Clarifications

Definitional Clarifications is realized in 17% of the research article introductions in this study thus suggests the conformity to CARS model (Swales, 2004) that this step is to be used as an optional step. While having a low preference, this study suggested this step to be retained in the rhetorical structure description of this study particularly, when Computer Science researches are "one of the fastest growing fields of knowledge" (Shehzad, 2012:34). With extensive applications in various disciplines, Computer Science discipline has many sub disciplines as well as cross discipline research, consequently; the readership encompasses readers beyond the core realm of Computer Science discipline. Therefore, brief definitional clarifications are needed to foster better understanding especially amongst readers from the sub disciplines.

5.2.2.4 Discussion on Move 3 Step 4: Summarizing methods

Results shows 53% of the research article introductions in this study utilized Move 3 Step 4 *Summarizing Methods* which supports Swale's suggestion (2004, p.232) that this step is "probable in some fields, but unlikely in others". However, the finding of this study differ with Shehzad's suggestion (2012) to have this step taken out from the Computer Science move model

Then again, Shehzad (2012, p.33) proposed on "eliminating the need to have definition clarifications and summarizing methods as separate steps as propagated in Swales (2004)". The argument is that Computer Science research articles are mostly about the "method, design or techniques" so to summarize the method would be inappropriate. However, this study prefer to keep to CARS model (Swales, 2004) that summarizing the method is retained as an optional strategy. The reason is because of the dynamic nature of Computer Science discipline and the general readership calls for a brief explanation on the method involved in the research. Even if the research article is about method development, a brief statement on what method is involved in the study would give the readers a clue on what to expect. While agreeing with Shehzad (2012) on the extent that a summary on the process of the method is unnecessary, this study holds that a brief and short statement on the method is still called for. All in all, this study proposed that summarizing the methods is retained in the rhetorical structure description of this study as an optional strategy.

5.2.2.5 Discussion on Move 3 Step 5 and Step 6

Results show 15% of the research article introductions in this study utilized Move 3 Step 5 *Announcing Principle Outcome* and 35% attempted Move 3 Step 6 *Stating the Value of the Present Research*.

While these moves are avoided by majority of the writers in this study, this study concurred with Shehzad (2012, 2010) that these steps serve the promotional strategy and should be obligatory in the Computer Science research article introductions. While the two strategies are ranked as optional and probable in some discipline (Swales, 2004), studies on Computer science research articles (Anthony, 1999; Posteguillo, 1999; Shehzad, 2012) showed that Announcing the principle finding is being used quite widely (see table 5.5). Promotional strategy has been reported to appear at 70% in 1999(Posteguillo, 1999) and 73, 21% a decade later (Shehzad, 2010). Posteguillo (1999) reported the use of announcing principle finding is widespread in computer science research articles at 70% occurrences and this finding is also supported by Anthony (1999) at occurrence rate of 75%. Looking at the studies over the decade it can be concluded that even though these steps are stated as an optional strategy (Swales 2004), the utilization of Announcement of principle findings as a promotional strategy in the Computer Science research article over the decade has increased and was described as "trending" (Shehzad 2010).

5.2.2.6 Discussion on Move 3 Step 7

Move 3 Step 7 *Outlining the structure of the paper* is realized in 35% of the research article in this study. This finding confirms Shehzad (2012) suggestion

that this step is optional for Computer Science research article introduction. Shehzad (2012) reported 86% of occurrences and stated that this move is meant "to inform the audience about the rhetorical form of the subsequent rhetorical text, while also functioning to summarize the information to be provided for the rest of the paper" (Shehzad, 2007:262).

However, analysis found that this move can be described as being monotonous and flat with repetitious structure. The realization of the move is straight, direct and uninterrupted by any excessive language. Generally, this step begins with a straight forward sentence on how the paper is organized. After stating the intention, the lists of the contents are given according to the section sequence. The forthright description on the structure of the paper enables the reader to anticipate the subject matters being discuss in the paper and where to locate the content in the research article. Such clear cut account and description ease the reader in retrieving targeted content.

Briones (2011) found 16.66% for realization of hypothesis and 6.66% for realization of research question in the research articles by the Philippines writers. A study on English Special Purpose (Atai and Habibie, 2009) research articles reported that this step is not attempted at all. Moreover, Computer Science researchers are mostly about developments of new methods, designs, techniques and applications (Shehzad, 2012). Providing definitional clarifications on the key terms, techniques, methods or designs facilitate the diversified readers to better comprehension.

Table 5.6

Move 3 comparison on non-native writers

Moves and Steps	This study Malaysian writers	Non-native writers			
		Briones (2012) (Philipines)	Sheldon (2012) (Spanish)	Adnan (2009) (Indonesian)	Safnil (2013) (Indonesian)
Move 3 Presenting the present work	91% Obligatory	30%	100%	Education 95.23% Linguistic 90.47% Socio political Science 90.47%	96.66%
Step 1 (Obligatory) Announcing present research descriptively and/or purposively	86% Optional (Underutilised)	30%	100%	NA	NA
Step 2 (Optional) Presenting RQ or hypothesis	1% Optional	6.66%	11.11%	NA	NA
Step 3 (Optional) Definitional clarifications	17% Optional	NA	11.11%	NA	NA
Step 4 (Optional) Summarizing methods	53% Optional	NA	16.66	NA	NA
Step 5 (PISF) Announcing principle outcomes	15% Optional (Underutilised)	3.33%	11.11%	NA	NA
Step 6 (PISF) Stating the value of the present research	35% Optional (Underutilised)	6.66%	11.11%	NA	NA
Step 7 (PISF) Outlining the structure of the paper	34% Optional (Underutilised)	6.66%	5.5%	NA	NA

Therefore it is suggested that the writers consider defining important terms, techniques and methods briefly in the introduction section. Due to the robustness of the Computer Science research, despite the low preference at 17% utilization, this study suggests that this step is retained as an optional step.

Definitional clarification The finding of this study agrees with Sheldon (2011) that *Definitional Clarifications* is not obligatory and may be used as preferred by the writer. Sheldon (2011) found the occurrence to be at less than 9% across the corpus studied.

Summarising methods Studies (Pho, 2008; Loi, 2010; Sheldon, 2011) have looked at the use of this step in research articles of various disciplines and concurred that this step is probable in some field but unlikely in others. Loi (2010) also found this step used as an optional strategy for research articles in educational psychology at 55 % occurrences by the native writers and only at 5 % in the research articles in Chinese. Sheldon (2011) on the same note also found this step to be an optional choice in Applied Linguistic research articles by the native writers and the research articles in Spanish. This study also found this step to be an optional strategy occurring in more than half of the research article introductions thus confirms Swales's (2004) suggestion that this step is probable in some fields, but unlikely in others.

5.2.4 Discussion on Moves and Steps for Computer Science

Analysis on the Computer Science group confirms the view that while there are similarities in the fundamental use of rhetorical strategies, distinct strategies are used in different disciplines as proposed by Holmes (2013) and Samraj (2002). All the moves and steps in CARS model are relevant to the rhetorical structure description of this study except for one. The analysis also indicates five underutilized moves and steps found in this corpus (see table 5.5). This discussion begins with a suggestion on taking out a step from the description of

rhetorical structure for this corpus. Next, the discussion is on the steps that are suggested as obligatory strategy in CARS model (Swlaes, 2004), but being underutilized in this study. Then, the optional steps specific for Computer Science discipline that has been underutilized found in the this study is examined.

Move3 Step2 *Presenting research questions or hypotheses* is suggested to be taken out from the description of rhetorical structure for this corpus because of the low utilization found in this study and following reports of low occurrences in the other studies. Only one of the 150 articles attempted this step. Moreover, this step was attempted at less than 8% in a few studies (Anthony, 1999; Atai &Habibie, 2009; Sheldon, 2011).

Next, the steps which were identified as obligatory in CARS model (Swales, 2004) but underutilized in this study are *Indicating a gap, Announcing present research descriptively/ purposively,*

CARS model (Swales, 2004) suggested that *indicating a gap* is an obligatory step, however this study found that *indicating a gap* is used as an optional step. The step is realized in only 73% of the research article introductions. Table 5.2 shows the comparison between the findings of this study with the previous findings found in studies on Computer Science research article introduction written by writers with no specificity to nationality. The studies found 91.7% realization (Anthony, 1999) and 95% occurrences (Shehzad, 2012) indicating that this step is used an obligatory strategy in Computer Science research article

introductions of the studies. Shehzad (2012) proposed a pattern for Computer Science research article introduction (Table 5.1, Column 3) which included *indicating a gap* as an obligatory move. Given that the Malaysian writers are writing for global readership, it is expected that the Malaysian writers are consistent with the global practice. This finding indicates that the Malaysian writers are using this strategy as an option when the global writers are more assertive in highlighting the gap of the study therefore more encouragement and effort must be put in utilizing this strategy

In addition to that, CARS model (Swales, 2004) also suggested that Move 3 Step 1 *Announcing the present research* is an obligatory step, however this study found that *announcing the present research* is being used as an optional step by the writers of in this study. *Announcing the present research* occurred in only 86% of the research article introduction in this study and are deemed as an optional step. Studies on Computer Science research article introductions written by writers with no specificity to nationality show a higher percentage of finding whereby Anthony (1999) found 100% realization, Posteguillo (1999) found 95% realization and Shehzad (2012) found 98% realization in the corpus of their study. The pattern for Computer Science research article introduction proposed by Shehzad (2012, p.29) (Table 5.1, Column 3) also include "announcing the nature (purpose, methods, techniques) of present research" as an obligatory move. Compared to the percentage from the previous findings (Anthony, 1999; Posteguillo, 1999; Shehzad, 2012) which are all in Computer Science discipline, it can be concluded that the attempts made by the Malaysian writers are much

lesser than those of international writers. The finding suggests that the Malaysian writers are employing this step at a lower rate compared to the international writers

CARS model (Swales, 2004) suggests *announcing principle outcomes* and *stating the value of the present research* as optional steps that may be probable in some field however, studies have shown that these steps are highly utilized by the Computer Science writers (Shehzad, 2012; Posteguillo, 1999; Anthony, 1999). The findings show that percentage of research article introductions that use the steps of *announcing the principle outcomes* and *announcing the value of the study* are at 15% and 35% respectively. Based on the percentage, this study suggest that the steps have been underutilized. Shehzad (2012) reported that more Computer Science writers promote their study by proclaiming the principle findings and highlighting the value of their study in the research article introductions. The low utilization by the Malaysian writers amid the growing practice in the global scene indicates a short coming of strategy use. Swales and Najar (1987) emphasized the need for announcement of the principle outcomes in the introduction section of the research articles. The highlight on the major findings is put in the introduction section to establish the research contribution as early as possible (Kanoksilapatham, 2007), rather than hoping for the chance that the reader would read all the papers up to the result section (Shehzad, 2010). Furthermore, the pattern for Computer Science research article introduction proposed by Shehzad (2012, p.29) (Table 5.1, Column 3) suggest "announcing principle findings and expressing their value" as an obligatory move. Posteguillo

(1999) reported the use of announcing principle finding is widespread in computer science research articles at 70% occurrences and this finding is also supported by Anthony (1999) at occurrence rate of 75% and later at 73% by Shehzad (2012). Looking at the development of the use over the years, it can be concluded that even though these steps are stated as an optional strategy (Swales 2004), the utilization of *announcing principle outcomes* and *stating the value of the present research* as a promotional strategy in the Computer Science research article has increased and is described as "trending" (Shehzad 2010). The attempts made by the Malaysian writers in this study is the lowest when compared to the percentage from the previous findings (Anthony, 1999; Posteguillo, 1999; Shehzad, 2012). It can be concluded that compared to the international writers, the strategy is underutilized by the Malaysian writers. These steps can be highlighted to the writers to increase the awareness on the existence and to encourage the use of this strategy.

5.2.5 Rhetorical structure guidelines

The analysis of the data has been presented according to the moves structure proposed in CARS (Swales, 2004). The frequency of each moves and steps are presented. The summary of the moves and steps are compared with the Computer Science rhetorical structure proposed by Shehzad (2010b) are added and presented in the beginning of Chapter 4 in the following table. The findings of the move analysis are summarized and presented table 5.7 The findings from the previous study on Computer Science research article introduction by Shehzad (2012) is also listed as comparison.

Table 5.7

Comparison on the move and steps for Computer Sciences research article introductions

	This study	Shehzad(2012)
Move 1 Establishing a territory Topic generalizations of increasing specificity	94% Obligatory	95% Obligatory
Move 2 Establishing a Niche (Citations possible)	100% Obligatory	93% Obligatory
Step 1A Indicating a gap	73% Optional (Underutilised)	95% Obligatory
Step IB Adding to what is known	99% Obligatory	NA
Step 2 Presenting positive justifications (optional)	62% Optional	NA
Move 3 Presenting the present work	91% Obligatory	NA
Step 1 (Obligatory) Announcing present research descriptively and/or purposively	86% Optional(Underutilised)	98% Obligatory
Step 2 (Optional) Presenting RQ or hypothesis	1% Optional	32% Optional
Step 3 (Optional) Definitional clarifications	17% Optional	NA
Step 4 (Optional) Summarizing methods	53% Optional	NA
Step 5 (PISF) Announcing principle outcomes	15% Optional(Underutilised)	73% Obligatory
Step 6 (PISF) Stating the value of the present research	35% Optional(Underutilised)	55% Obligatory
Step 7 (PISF) Outlining the structure of the paper	34% Optional(Underutilised)	86% Obligatory

The patterns identified indicated the common and underutilized moves and steps which bring forth some pedagogical considerations. Table 5.7 shows that 94% of the article introduction sections in the study utilized Move 1 at an obligatory level, which is close to the 95% occurrences in the study by Shehzad (2012). Similarly, Move 2 "Establishing a niche" has also been fulfilled at an obligatory level by the writers in this study. However, Move2 Step 1A has been underutilized in only 73% of the article introductions as compared to 95% occurrences in the study by Shehzad (2012) and 91.7% in the study by Anthony (1999). The writers in this corpus have underutilized the strategy of Move 2 Step 1A which is "Indicating a gap". Such low percentage is to be addressed as

Shehzad (2012) has reported that this step is used at an obligatory level by the Computer Science writers in her corpus. Alternatively, the writers in this study have utilized Move 2 by using Step 1B "Adding to what is known" which has been fulfilled in 99% of the corpus. Even though, this step is not available in the previous CARS model (Swales, 1990) used by Shehzad (2012) thus not available for comparison, the percentage of 99% showed that Move 2 Step1B is the most preferred step to realize Move 2.

Move 2 Step 2 "Presenting positive justifications" is also not reported by Shehzad (2012) and only occurred in 62% of the corpus. In short, comparing the percentages of the three steps for Move 2 "Establishing a niche", it can be concluded that most of the writers prefer to add "to what is known" compared to Indicating a gap" and "presenting positive justifications". Least attempt was made using Step 1B "presenting positive justification" with only 62% occurrences nevertheless; the occurrences which are at optional level, concurrence with the suggestion in the CARS model (Swales, 2004). In correspond to the findings on Move 1 and 2, it is suggested that more emphasis and caution on utilizing Move 2 Step 1A "Indicating a gap" is given in the teaching of writing using CARS model (2004) to Computer Science writers in Malaysia.

Move 3 is deemed as an obligatory Move with 91% occurrences. While the percentage for Move 3 is high, the percentages of the steps used to realize this move indicate that some of the steps are underutilized. Step 1 for Move 3 "Announcing present research descriptively and/or purposively" has been

underutilized at only 86% compared to 98% in Shehzad (2012). In addition to the lower percentage, the corpus utilized Move 3 Step 1 A as an optional step as such diverted from the CARS model (Swales, 2004) which has the step as an obligatory. Move 3 Step 2 has also been utilized in a smaller percentage compared to the study by Shehzad (2012). Only 1% of the corpus opts for this step compared to 32% in Shehzad (2012). Despite having a small percentage, the low preference in using this step it is not problematic because this step is also suggested as an optional step in CARS model (Swales, 2004). Move 3 Step 3 "Definitional clarifications" and Move 3 Step 4 "Summarizing methods" are realized at 17% and 53% respectively. The utilization of both steps are at an optional level as such corresponds with CARS model (Swales, 2004). However, percentages from the previous studies on Computer Science articles are not available for comparison because these steps are newly added in CARS 2004 model (Swales 2004) whereas most of the studies used CARS 1990 model (Swales, 2004).

The steps in Move 3 are less fixed in orders and may appear before one or another. Swales (20040 suggested that Step 5, Step 6 and Step 7 are possible in some field but may also be unlikely in others. In this study, Move 3 Step 5 "Announcing principle outcomes" is realized in only 15% of the corpus. The percentage of 15% is alarmingly low as the utilization of this step in similar studies suggested that this step is realized at higher percentage of 73% in Shehzad (2012), 70% in Posteguillo (1999) and 75% in Anthony (1999).

Furthermore, Shehzad (2012) suggested that this step is an obligatory strategy for Computer Science articles. Move 3 Step 6 "Stating the value of the present research" is also underutilized at 35% compared to 55% by Shehzad (2012). This step is recommended as an obligatory step in Computer Science research article; however the corpus of this study has the step as an optional strategy. In addition to the low percentages in Step 5 and Step 6, Move 3 Step 7 "Outlining the structure of the paper" is also realized at a low percentage of 34% compared to the other studies with 86% (Shehzad, 2012), 70% (Posteguillo, 1999)and 83.3% (Anthony, 1999). Following the low utilization when compared to the other Computer Science corpus, Move 3 Step 5, Step 6 and Step 7 must be emphasized in the writing classroom for Computer Science writers in Malaysia.

In short, the patterns of the findings indicate the common Moves and Steps that are being utilized by the Malaysian writers. The underutilized Steps have also been identified and thus suggested the need for more emphasis and caution in the application of CARS model in teaching writing for this group. While the findings indicated the applicability of CARS model (Swales 2004), the description on how the moves and steps are utilized in target publication is still needed; particularly when many English teachers are not content experts in Computer Science discipline.

The following table 5.8 elaborates on the patterns of how the Moves and Steps have been utilized in the corpus. The realizations of the Moves and Steps suggested a few patterns that bring forth a few techniques.

Table 5.8

Patterns on techniques used to realize the Moves and Steps in Computer Science research article introductions written by academicians in Malaysian universities

Moves and steps	Realization techniques
Move 1 (Obligatory) Establishing a territory Topic generalizations of increasing specificity	• By providing description related to the study • By giving definition related to the study • By commenting on the general topic of the research.
Move 2 (Obligatory) Establishing a Niche (Citations possible)	• By using any of the following obligatory and /or optional steps.
Step 1A Indicating a gap (Optional) Underutilised	• By indicating limitation in the research area • By suggesting a problem that needed to be solved • By conveying the suggestions of research • By previous researchers • By extending the works of others and illustrated
Step IB Adding to what is known (Obligatory)	• By giving information and ideas with no citation • By adding comments and ideas to the cited work • By developing the idea from cited work via adding other cited works.
Step 2 Presenting positive justifications (optional)	• Direct justification on the need for the study • direct justification on the benefit of the study • Indirect justification by giving the drawbacks of not having the study • Embedded in Move 3 • By using a combination of the above techniques.

Table 5.8 Continued

Move 3 (Obligatory) Presenting the present work	• By using any of the following obligatory and /or optional step
Step 1 (Obligatory) Announcing present research descriptively and/or purposively (Currently Optional - Underutilised)	• Announcing the present research descriptively • Announcing the present research purposively • Using the research objectives • By embedding the announcement into the other steps in Move 3.
Step 2 (removed) Step 3 (Optional) Definitional clarifications	• By giving reference • By giving a regularized meaning to the term throughout the research article.
Step 4 (Optional) Summarizing methods	• By describing the process and procedures • By justifying the chosen methods.
Step 5 (Obligatory) Announcing principle outcomes (Currently optional, Underutilised)	• By making a direct announcement on the findings • By embedding the announcement with the other steps of moves3
Step 6 Stating the value of the present research (Obligatory)	• By using stylized words like "new techniques" or "new feature" to highlight research novelty and research extension; "optimize" to highlight added value. • By using comparative words like "more consistent" to assert the value of the research.
Step 7 Outlining the structure of the paper (Obligatory)	• By being direct and devoid of any excessive language • By being clear on telling the reader what to expect from the article • By describing briefly the content of each sections.

Table 5.8 illustrates the patterns on techniques used to realize the Moves and Steps in Computer Science research article introductions written by academicians in Malaysian universities. Move 1 *Establishing a territory: Topic generalizations of increasing specificity* is obligatory and have been realized using four identified techniques. The techniques used are "By providing description related to the study", "By giving definition related to the study "and

"By commenting on the general topic of the research". The techniques used to realize Move 1 are elaborated in Section 4.2.1 *establishing a territory* page 138. The techniques used to realize all the other Moves and Steps are also explained in the sections designated for each move and steps in section 4.2.2, page 150 to section 4.2.3.page 194. For each technique, authentic example can be taken from the mentioned sections and the examples can be used to in teaching and learning of research article introductions writing. The column moves and steps show the rhetorical structure expected from the group. Some on the moves and steps labelled underutilized indicate the possible problematic strategies that requires extra caution. The column technique contains the ways how these moves and steps were realized in the corpus of this study.

5.3 Discussion on Research Question 2

RQ2: To what extent do the academicians in Malaysian universities conform to the CARS model (Swales,2004) in writing Computer Science research article introductions?

Over all, the description of the move and steps in Section 5.1 has indicated that the corpus of this study conform to most of the moves and steps suggested in the CARS model (Swales, 2004), however when analyzed according to groups, some differences in the conformity has been detected. The differences in the conformity is better explained when the findings are analyzed according to aspects. Therefore, this section discuss the conformity of Malaysian writers to CARS model (Swales) according to the following aspects: 1) University group.

2) Journal wise population. 3) High and Low Citation. 4) Computer Science sub discipline.

5.3.1. Discussion according to University groups

The analysis according to the university group shows that all groups conforms to CARS model in establishing the niche of the research however, there are some differences in the way the writers indicate the research gap, present the intended research work and establish the territory of the research.

The analysis according to the university groups indicates that all of the groups did not conform to CARS model (Swales, 2004) in realizing the strategy on indicating the research gap as an obligatory strategy. All of the groups used this strategy as an optional strategy instead of as an obligatory strategy.

In addition, the analysis shows that Comprehensive university group, Research University Group and Private University group do not conform to CARS model (Swales, 2004) on the step for announcing *present research descriptively or purposively* which is proposed to be an obligatory strategy. Instead of using the step as an obligatory step, the three groups use this step as an optional step. The three groups mentioned realized this step at 88%, 82% and 80% respectively..

The analysis based on articles from Apex university group indicates that the group did not conform to CARS model (Swales, 2004) on Move 1 which suggests that the Introduction section is to begin with establishing the research territory. Establishing the research territory is realized by making a topic generalization with increasing specificity before moving into the research niche.

Only 80% of the articles in the APEX university group start their Introduction with topic generalization thus indicating that this strategy is used as an optional strategy instead of as obligatory move as suggested in CARS model (Swales, 2004). CARS model (Swales, 2004) proposed that research articles need to address the general audience before going deeper into the research niche. Skipping the topic generalization suggests that some of the writers do not start the introduction with a general research view but instead, jump straight into the research niche. Apart from *establishing a territory* and *indicating a gap*, the APEX university group conform to all the other strategies in CARS model (Swales, 2004).

Comparing the university groups, the focus groups conform the most to CARS model (Swales, 2004) with only one difference. The difference is on having *indicating a gap* as an optional strategy instead of as an obligatory strategy.

In short, the analysis according to university group shows that all university groups conforms to CARS model in establishing the niche of the research however, there are some differences in the way the writers indicate the research gap, present the intended research work and establish the territory of the research. All university groups used *indicating a gap* an optional strategy instead of as an obligatory strategy as suggested in CARS model (Swales, 2004)

5.3.2. Discussion according to High and Low Citation Index

The analysis according to the citation index shows that both groups conforms to CARS model in establishing the territory of the research and establishing the

niche of the research however, there are some differences in the way the writers indicate the research gap and present the intended research work.

Both high citation group and low citation group conform to CARS model (Swales, 2004) suggestion on establishing the territory of the research as a compulsory strategy with 97% and 91% realization respectively. Both groups also conform to CARS model (Swales,2004) on *establishing a niche* of the study and *adding to what is known* as compulsory strategies. Similarly, both groups conform to CARS model (Swales, 2004) to present the positive justification of the study as an optional strategy.

On the other hand, there are some differences in the way the writers indicate the research gap. CARS model (Swales, 2004) proposed *indicating a gap* as an obligatory step however, both groups did not conform by having this step as an optional step. However, the articles in the high citation index group made more attempts to indicate the research gap compared to the articles in the low citation group. The percentage for the high citation group is at 86% which is higher than the low citation group which is at 71%. The percentage for high citation group is higher than the whole corpus percentage while the low citation group has a lower percentage than the whole corpus percentage. Compared to the other groups in analysis according to university, journal and sub discipline, the percentage of the high citation group remain as the highest and the closest to the conformity level which is at 90%. The comparison indicates that the writers of this group makes more attempt to point out the research space which exist in the body of research and to convince that the research space reveals requires further

investigation. Nevertheless, both groups do not conform to the CARS model for this step.

In addition to that, the extent of conformity is also different the way the research work is presented. The high citation group conforms to CARS model (Swales, 2004) that *presenting the present work* is an obligatory move while the low citation group did not. Finding shows 92% of the high citation group *announce the present research descriptively or purposively* while only 75% of the low citation group do so in the introduction section. This indicates that the high citation group make more attempt to present their research work in the introduction section which is supposed to engage and appeal the readers thus capturing their interest to read further. The readers thought steers from discovering the importance of the niche to realizing how the current research intends to contribute to the niche area. Given the importance, CARS model (Swales, 2004) has this step as an obligatory step however, the low citation group treat this strategy as an optional step indicating a variance.

Both groups conform to CARS model (Swales 2004) on the suggestion related to steps that are *possible in some field*. CARS model (Swales, 2004) suggested that it is possible in some field for writers to announce the principle outcome, state the value of the study and give an outline on the structure of the paper. However, the high citation group were found to utilize this steps more than the low citation group. It was found that the high citation group were more likely to state the value of the research compared to those in the low citation group at percentage of 44% and 28% respectively.

In short, both groups conforms to CARS model in establishing the territory of the research and establishing the niche of the research however, there are some differences in the way the writers in the two groups indicate the research gap and present the intended research work. Both groups do not conform to have the step of *indicating a gap* as an obligatory step. The low citation group also does not conform to the move on *presenting the present work* and *announcing present research descriptively or purposively* by having these strategies as an optional strategy instead of obligatory strategy as suggested in CARS model (Swales, 2004).

5.3.3. Discussion according to Journal wise population

The analysis according to the journal wise group shows that both journal groups conforms to CARS model in establishing the territory of the research and establishing the niche of the research however, did not conform in realizing the steps for indicating the research gap and presenting the intended research work

Both journal groups conform to CARS model (Swales, 2004) suggestion on establishing the territory of the research as a compulsory strategy at 100% for Malaysian Journal of Computer Science (MJCS) and 95% for Pertanika Science and Technology. Both groups also conform to CARS model (Swales, 2004) on *establishing a niche* of the study and *adding to what is known* by having these strategies as compulsory as obligatory strategies. Similarly, both groups conform to CARS model (Swales, 2004) by using the step of presenting *the positive justification* as an optional strategy.

However both journals did not conform to CARS model (Swales, 2004) in using *indicating a gap* as an obligatory step. Both groups have used this step as an optional step. The findings show that 78% of the articles in MJCS and 71% of the articles in Pertanika use this step therefore rendering the step as an optional step instead of as an obligatory strategy as suggested in CARS model (Swales, 2004)

Apart from that, it was found that, the MJCS journal group conform to the CARS model (Swales, 2004) by have the *presenting the present work* as an obligatory move while the articles in the Pertanika group do not conform by having this move as an optional move. Findings show that 100% of the articles in the MJCS journal group present the research work in the Introduction section whereas only 79% of the articles in Pertanika do so. More articles in Pertanika prefer to delay the presentation of their research work in the next sections. This could be because the articles in Pertanika have Materials and Method section after Introduction section so many of the writers introduce the intended study here instead of doing so in the Introduction section. On the other hand, the MJCS follow the Introduction –Method –Result Discussion section structure. As such the presentation of the intended research is mostly done in the Introduction section. The difference between the two suggests that the article structure prescribed by the journal also shape the way the introduction section is written.

On the other hand, Posteguillo (1998) and Shehzad (2012) found higher percentages at 22.50% and 32% of realization respectively. The percentage is higher compared to the finding of this study which is only at 0.66%. Shehzad (2011:152) has suggested that the

higher percentage found is due to the journal preference where the journals were identified to have "...introduction with clear research questions".

In short, the analysis according to the journal wise population suggest that both groups conform to most of the move the CARS model except for the step of *indicating a gap.* The Pertanika journal does not conform to CARS model in having *presenting the* present *work* as an obligatory move. The non-conformity could be due to the article structure prescribe by the journal itself where the announcement of the present work is done in the Materials and Method section.

5.3.4. Discussion according to Sub Discipline

The analysis according to the Sub discipline group shows that both, the Computer Science group and the sub discipline group conforms to CARS model *in establishing a territory* of the research and *establishing a niche* of the research however, there are some differences in the way the writers indicate the research gap, announcing the present work and summarizing methods.

Computer experts classify the articles into Computer Science group or Sub discipline group and the analysis on the groups shows that both groups conform to CARS model (Swales,2004) on having *establishing the territory* of the research is an obligatory strategy. More than 90% of the articles in both groups make used of this strategy. Similarly both groups conform to CARS model (Swales,2004) in justifying the need for the study as an optional strategy with 62% for the Computer Science group and 50% for the Sub discipline group.

The difference of percentage is attributed to the different needs between the two groups. Compared to the sub disciplines group, the Computer Science writers are more compelled to justify the need for the study which is reflected in the finding of 5 techniques used by the writers to realize this step. The distinct need to present positive justification of the study by the Computer Science group supports the view on distinctive use of rhetorical strategies in subgenre proposed by Holmes (2013). Holmes found fundamental similarities and also distinctive use of step in the study on three disciplines. In this study, the distinctiveness is in the higher preference for this step by the Computer Science groups.

Next, the findings of this study corroborate with views that distinct strategies are used in different subdisciplines. Holmes (2013) and Samraj (2002) proposed that distinctive rhetorical structures are employed in research articles of different disciplines. This study found 100% of the Computer Science research article introductions utilized this step while only 72% of the subdisciplines group attempted this step. Announcing the present research descriptively or purposively is an obligatory strategy for the Computer Science group and the sub discipline group utilized this step as an optional strategy.

However, both groups did not conform to the CARS model (Swales, 2004) recommendation to state the research gap in the introduction section. Both groups have utilized this step as an optional strategy. The result shows 70% of the Computer science group indicate the research gap and 68% of the Sub discipline group do so.

In addition, in fulfilling the step for *announcing the present research,* the Computer Science group conforms to the CARS model (Swales, 2004) in having this step as a compulsory strategy while the Sub discipline group did not conform by having this step as an optional step. The Computer Science group has a 100% occurrence while only 72% of the Sub discipline group uses this strategy.

Findings from the interview suggest that the writers are aware of the strategy on presenting positive justification for the study. However, the understanding on how to fulfil this step is that giving justification is perceived as giving the aims, the importance of the study and the objective of the study whereas CARS model suggests this step as stating reasons as to why the research gaps need to be fulfilled. CARS model suggests that this step states the ground for a study in the area however, mentioning about the study as perceived by the interviewees is considered as Move 3 which is presenting the present work.

In short, both groups conform to the most of the strategies in CARS model (Swales, 2004), except for the strategy to indicate the research gap where both groups used this strategy as an optional strategy instead of as an obligatory strategy as proposed in the model. It was also found that the Computer Science group conform to have *announcing present research* as an obligatory strategy while the Sub discipline group did not conform by having this strategy as an optional strategy. The findings therefore confirm the view on the distinctive use of strategies in sub discipline genre.

5.4 Summary of the discussions

All in all, this study confirms that there are similarities in the fundamental use of rhetorical strategies in research article introductions. However, this study also corroborate with views that distinct strategies are used in different sub disciplines. In addition this study also confirms that unique rhetorical structure prevails as to meet the expectation of the targeted journal. Apart from that, this study proposed that highly cited research article introductions utilized some rhetorical strategies at a higher rate than the research articles that have never been cited. Additionally, this study also agrees that writers of the same discipline but different culture have distinct preference of rhetorical strategy.

In short, the findings suggest that the utilization of establishing a territory by the writers in this study is at par with the international Computer Science writers and the non-native writers in the other studies (Anthony, 1999; Briones, 2012; Safnil, 2013; Shehzad, 2012; Sheldon, 2011). The finding also concur that establishing a territory is an obligatory move in research article introductions in any research discipline and in research articles introductions written by non-native writers. However, even though establishing a territory has been utilized as obligatory strategy in the research article introductions on this study, the utilization of citation has been delayed or even totally omitted. Therefore, more citation in Move 1 is preferred to comply with the expectation of the wider culture.

5.5. Implications of the Study

Even though distinct rhetorical strategies are preferred by writers of different culture, it is important for the writers to comply with the global practice, particularly when the publication is meant for international readership. Therefore, it is important for the writers and writing instructors to be aware of the common rhetorical structure practiced by the global discourse community so that efforts can be geared to meet the expectation of the targeted audience. At the same time awareness on how the writers' actual practice is, give a perspective on what measures need to be taken.

5.5.1 Implications for the writing instructors

This study has given more understanding on rhetorical structure in research article introductions. The implication of this study can be categorized into three parts mainly to the writing instructors, to the research article writers and to the research of non-native writing.

This study have a few implications to the writing instructors particularly in recognizing the rhetorical structure practiced in the global discourse, establishing understanding on rhetorical structure practiced by the Malaysian writers Computer Science group, and providing a list of techniques for teaching of move and step realizations.

Writing instructors must establish understanding on the rhetorical structure practiced in the global discourse. Rather than relying on experience and gut feelings on the proper ways, understanding on the rhetorical structure practiced by the Computer Science global community, would enable the writing

instructors to impart more realistic guidance. The description on the general structure of the whole research articles described using the Introduction-Method-Result-Discussion structure and the move and steps for research article introductions is necessary for the instructors to guide the student to deliver the expected structure.

In addition, by understanding the rhetorical structure practiced by the Malaysian writers Computer Science group, the writing instructors would know which move and step to emphasize on during teaching. Given that some of the steps were necessary but often not employed, the writing instructors must take precaution to ensure that the warranted strategies are fulfilled.

Finally, the list of techniques for teaching of move and step realizations given in the guidelines can be used by the writing instructors to develop teaching materials. Understanding on the rhetorical structure, moves and steps must come together with the knowledge on how to achieve them. The illustrations of each technique in chapter 4 offer authentic materials for teaching purpose hence provide examples for easy teaching and learning.

5.5.2 Implications for research article writers

The implications of this study to the research writers are mainly in establishing understanding on the rhetorical structure of the target publication and providing the writers with some examples on how to realize the expected moves and steps.

Research article writers must understand the rhetorical structure in the research article. While proof reading can solve most grammatical and lexicon mistakes,

research writers must put forward research ideas on their own ideas. Understanding the common rhetorical structure being practice by the targeted publication would help the writers to write faster. Knowing the expected structure saves the writer from writing blocks. The writer also can concentrate on the research details rather than pondering on how put the ideas in words.

This study is likely to help Malaysian research article writers be aware of the various ways that can be used to realize the expected rhetorics. This study have shown that there are many steps that can be used to accomplish a rhetorical strategy however Malaysian writers have restrained from using some of them. As such, the techniques and illustration of realization found in this study provide the writers with some examples on how to realize the expected moves and steps.

5.5.3 Implications for research on Non-native English writing.

The findings on the moves and steps and problems of writing adds on to the understanding of rhetorical strategies in research articles written by non-native English writers. Researchers (Swales, 1990; Hyland, 1995; Flowerdew, 1999) have cautioned that the rhetorical discourse is challenging even for native English writers. This research has examined the actual practice of non-native English writers in the international English publication. This study gives the description on the strategies used by the non native writes. The findings track the regularities and irregularities in strategy use amongst the non native writer.

5.6 Limitations of the study

One of the limitation faced by the researchers is the collection of data using the interview. The writers were not willing to be interviewed because they were

busy with their academic and research work so only four writers were interviewed. Next, the limitation of the study is in the specification of the corpus where the research was conducted solely on the Computer Science research articles. The rhetorical strategies investigated were specifically for Computer Science research article therefore the guidelines may not be accurate for use in other disciplines. In addition, the research articles are indexed in Scopus in 2010. Due to the dynamic nature of research article writing, the description of the rhetorical strategies for this group may not be accurate for research articles indexed in a different database or decade.

5.7 Recommendations for future research

There are many opportunities for research in rhetorical strategies of research article. Based on the findings of this study, it is recommended that similar investigation is conducted on research articles of other disciplines. Investigating research articles in other disciplines would generate new description on the various rhetorical structures. In return, the new profile can be turn into new guidelines.

It is also recommended that further investigation is conducted on the linguistic descriptors for the moves and steps. This study has proposed the techniques that can be used to realize the moves and steps therefore, findings on the linguistic descriptors would complement the techniques making the moves and steps easier to be fulfilled by the writers. Finally it is recommended that further studies are conducted on teaching research article writing using the guideline and techniques discovered in this study. Such study can also explore if the

underutilized moves and steps are more prevalent after teaching the techniques to the writers.

5.8 Conclusion

Writing research article for international publication has been a challenge to the academicians. The Introduction section has been reported as being the most difficult to write because this is where the author need to capture the interest of the readers otherwise the readers may move on to another article. On top of that, the author needs to consider various readerships such as the editor, reviewers, fellow research community. Such complex writing requires effective rhetorical strategy. This problems leads to the purpose of this research which is to investigate the moves and steps typically used in Computer Science research article introductions written by academicians in Malaysian universities. Another motivation for this study is to investigate the other problems faced by the Malaysian academicians in writing the Computer Science research article introductions.

This qualitative study used Introduction-Method-Result-Discussion structure (Sollaci & Pereira, 2004) for Macro analysis and CARS model (Swales, 2004) for the micro analysis. Apart from the text analysis, interviews were also conducted. Findings show that one of the steps suggested in CARS model was deemed as irrelevant and was taken out of the rhetorical structure description. Five of the steps in CARS were found underutilized. 12 moves and steps were included in the Computer Science research article introductions guidelines. The study identified close to 30 techniques that have been employed by the writers

of the research articles in the study. These techniques were also included in the guidelines.

The implication of the study is that the guidelines can be used by the writers and language instructors in the teaching and learning of research article writing. However, the rhetorical structure description and guidelines are only applicable to Computer Science research article written by Malaysian writers. Therefore, further studies on research articles in other disciplines or written by other nationals are recommended.

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