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# ESL PRE-SERVICE TEACHERS' ONLINE INFORMATION SEARCHING STRATEGIES: PRELIMINARY DATA FOR TPACK DEVELOPMENT PROGRAM FOR TEACHER EDUCATION

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**Abstract:**

The reality brought upon by the pandemic has forced educators, language instructors included, to re-evaluate their practice by ensuring that the actual learning takes place and planned objectives are met. In language education programs, equipping future teachers with appropriate knowledge and skills remains as the top priority. In fact, recent literature also highlights the need for teachers to have technological pedagogical content knowledge (TPACK) to cope with the changing demands of online learning and learner diversity. As part of the needs analysis phase to assess students' TPACK competency, students' online information searching strategies were investigated by using Information Commitment Survey (Wu & Tsai, 2007) and content analysis of the references list of students' written coursework and guided reflection. In this case study, the participants were the ESL pre-service teachers in a teacher education program. It was found that the students used multiple web searching strategies such as matching and elaboration strategies. The students also appeared to have 'mixed' standards for judging information on the web. The results additionally revealed that students relied heavily on different web resources such as online encyclopaedia, and resources that contain grammar materials, content materials related to their writing topic, citation materials and writing samples that match their writing format. These findings strongly suggest for a more systematic training design of the online writing support

should be in a form of a portal of evaluated links to useful resources for ESL writing

**Introduction**

The gradual reopening of educational establishments all over the world since the beginning 2022 has finally marked the end of the devastating Covid19 pandemic. In Malaysia, public schools and institutions have resumed operation since March 2022 with vigilant standard operating procedures issued by the respective ministries (Liew, 2022). However, there lies a dilemma most likely faced by instructors or educators: should we go back to where we were before or learn from what we have been through, press forward, push boundaries, and reimagine what education can be? Regardless of the answer, technology still lies in the heart of education. The rapid progress in technology has greatly influenced the process of teaching and learning, especially in the use of computers and the Internet particularly among students. In fact, it is not at all presumptive to argue that our younger generation, generation Z, is fully dependent on technology (Ryzhanova, Potomkina and Polyanichko (2021).

At tertiary level especially, a number of studies has captured how technology plays a vital role in academic writing (Said, Soekarno, Nik Mohamed & Pudin, 2021; Ismail, Husin & Darus, 2013; Yunus, Kiing and Salehi, 2013). However, such affordances could also lead to the misuse of the Internet resulting in plagiarism or academic dishonesty in students' writing. Nabee, Mageto & Pisa (2020) and Olivia-Dumitrina, Capsanovas & Capdevila (2019) conceded that plagiarism is indeed a prevalent issue among university students. Multiple factors have been identified to contribute to such academic dishonesty. For instance, as non-native speakers, students may perceive the Internet as a solution to language barrier which impedes in the relay of the intended message. Other factors include the feeling of being overwhelmed by the infinite volume of information available on the Internet causing students struggling to filter, analyse and synthesise information, and students' inability to employ appropriate online searching strategies. Chen (2020) lent credence by highlighting a serious concern among the ESL students in her study. The researcher found that her subjects lacked the specific skill related to self-awareness of searching orientation when searching for English information. She argued that though students at tertiary level are supposed to be independent, much needs to be done especially by instructors to support the students' information needs.

Recent studies on the online searching strategies employed by students have been a focus of interest for more than a decade (Mao, Wang, Tang & Chong, 2022; Ozkanal, Gulen & Gunez, 2021; Chen, 2020;;; Tuluk & Kepceoğlu, 2019). The more recent work by Mao et al. (2022) sheds a light on the importance of understanding the online searching strategies used by students to obtain information on the Internet. Using screen capturing method, the researchers focused on the level of creativity of the keywords used and the number of webs explored by their subjects. The researchers concluded that the subjects lack sufficient awareness of their strategies which explained the low success rate of online searching outcomes. In another study by Tuluk & Kepceoglu (2019), the relationship between pre-service teachers' web pedagogical content knowledge and online searching strategies was examined. Their findings also echoed the similar struggle faced by online learners: that the subjects relied heavily on Internet to

search for information on the internet, encountered problems in using search engines, determining keywords in online information search, and not evaluating search results. Ozkanal et al. (2021) found that there are significant differences between online information searching strategies and age, gender, enrolment type among the distance learners. They concluded that having experience is a predictor of higher outcome and therefore training on Internet searching skills and strategies should be provided to students.

In past studies, the focus was more on identifying the specific strategies employed by students when using the Internet. Kuiper, Volmen & Terwel (2008) posited that in the process of information searching, the searching strategies learners employ may guide their searching behaviours on the Internet. However, when searching information in web-based learning environments, students with expert Internet experience demonstrate better searching strategies than those with novice Internet experience. They concluded that the process of information searching, the searching strategies learners employ may guide their searching behaviour on the Internet. Wu & Tsai (2007), on the other hand, differentiated the strategies used between expert and novice users. They also contended that the use of different strategies could be the result of learners' performance and outcomes derived from web-based learning environments. This means that learners may use a variety of searching strategies on the Internet. These online searching strategies may be considered as their approaches to learning in web-based learning environments. Junni (2007) investigated strategies employed by graduate students by analysing their theses' reference lists. It was found that students relied heavily on the Internet as information sources, and there was a varied list of different types of sources used. Internet searching behaviour is also a topic of investigation by George, Bright, Hurlbert, Linke, St. Clair & Stein (2006). They also discovered that the Internet was used as a source of scholarly information among graduate students, and various strategies were employed. This further supports the notion that students nowadays rely heavily on the Internet as an information source.

Implications of the reviewed studies include prioritising the need to identify students' actual online searching behaviours before prescribing support or training to increase searching output and develop students' have technological pedagogical content knowledge (TPACK). In addition, systematic and dedicated TPACK development programs or support to assist students in improving their online searching experience and skills should be given utmost importance by instructors. This study was initiated as the researchers believe that students are in a dire need of support which could develop their technological skills and competency, including online searching strategies. The support should cater to the students' needs to ensure continuous use of the proposed solution through the use of Analyze, Design, Develop, Implement and Evaluate (ADDIE) instructional design model. ADDIE model has been used within educational environments to facilitate the construction of knowledge and skills during episodes of guided learning. In the initial stage of ADDIE- the analysis phase, it is crucial to determine the answers for some questions such as who the intended users are, what their goals and tasks are and what is their context of use. Apart from that, it is also important to identify users' learning characteristics, motivation, technology affordance, strategies, and learning goals. Based on this premise, therefore, researchers in this study sought to answer the following questions: What strategies do students employ in using the Internet? What types of Internet resources did students use in their written coursework?

**Methodology**
Concurrent Triangulation Strategy was employed in this study as both quantitative and qualitative instruments were collected during the same stage. The purpose of this strategy is to use both qualitative and quantitative data to define relationships more accurately among variables of interest which are students' perception of their use of online strategy, and the actual online resources used in their writing. The different instruments used will offset the weaknesses of one method with the strengths of the other method (Almeida, 2018). The selection of such a strategy was made to further strengthen the findings from the combined instruments in the interpretation phase. The participants were 20 students majoring in the Teaching of English as a Second Language (TESL) who enrolled in a language development course in 2018/2019 semester. The purposive sampling was utilized as the intervention designed would specially cater to their specific needs.

*Data sources*
A few instruments were used in the study. A questionnaire adopted from Wu & Tsai (2007) was used to identify the searching strategies employed by students when they searched the Internet. The Information Commitment Survey (ICS) included six constructs which were presented with bipolar strongly agree/strongly disagree statements in a six-point Likert scale (i.e., strongly agree, agree, somewhat agree, somewhat disagree, disagree and strongly disagree). Pre-testing was done to find out if there are any problems or issues related to the instrument. Apart from that, 86 documents were retrieved to analyse the reference list. A checklist categorising the types of references/sources was developed. Guided reflections submitted by students on the frequency and types of information sources used in written courses were also thematically analysed.

*Data Analysis*
Descriptive statistics of mean and standard deviation were used to present the findings from the questionnaire, apart from frequencies. Apart from that, mean values and standard deviation obtained for the questionnaire would be presented according to the main constructs in order to explain respondents' strategies in detail later in the discussion part. The mean value would be described according to the following: 2.00 and below (low), 2.10-3.99 (average) and 4.00 – 6.00 (high). The qualitative data obtained from the content analysis of the reference lists in respondents' written coursework was analysed quantitatively. Data was coded and categorised into the types of Internet sources used. For the written reflections, data was qualitatively analysed by analysing and coding into several themes and categories.

**Results and Discussion**
A triangulation of the three methods of the questionnaire, analysis of reference lists and reflections further support the findings.

*Research Question 1: What strategies do students employ in using the Internet?*
The analysis done on students' searching behaviour using the Information Commitment Survey is presented as below.

## Table 1: Information Commitment Survey Results

| No | Item | Mean |
|---|---|---|
| | When I search information on the Internet, | |
| 1 | I am used to summarize a variety of information. | 4.68 |
| 2 | I can use some acquired information for advanced search to find the most-fit information. | 4.74 |
| 3 | I can integrate the information obtained from a variety of Web sites. | 4.84 |
| 4 | I can keep reminding myself about the purpose of my searching. | 4.89 |
| 5 | I can compare different information from related Web sites (or pages). | 5.00 |
| 6 | I usually only use search engine to find the most-fit Web sites (or pages). | 4.32 |
| 7 | if I find the first relevant Web site, I will not search others. | 4.21 |
| 8 | I am eager to find a single Web site that contains the most fruitful information. | 5.32 |
| | When I view some information unknown on the Internet, | |
| 9 | I will discuss with teachers or peers, and then to judge whether the information is correct | 3.95 |
| 10 | I will explore relevant content from books (or print materials), and then to evaluate whether the information is correct. | 3.89 |
| 11 | I will try to find more Web sites to validate whether the information is correct. | 5.16 |
| 12 | I will believe in its accuracy if the information is posted in famous Web sites. | 4.16 |
| 13 | I will believe in its correctness if the information appears in government Web sites. | 4.95 |
| 14 | I will believe in its accuracy if the information is posted in professional (official) Web sites. | 5.05 |
| 15 | I will believe in its correctness if the information appears in some Web sites recommended by experts. | 5.11 |
| | When I view or navigate information on the Internet, | |
| 16 | if its content fits my searching goal, I will think the information is useful to me. | 5.00 |
| 17 | if it can provide more related links, the information for me is useful. | 4.68 |
| 18 | if it can help me search relevant information further, I will think the information is useful to me. | 4.74 |
| 19 | if it is closer to my searching purpose, I will more believe in its usefulness. | 4.84 |
| 20 | if it is highly related to my intended searching content, the information for me is useful. | 5.05 |
| 21 | if it is presented by animation, I will think the information is useful to me. | 3.42 |
| 22 | if it does not take much time to be retrieved, the information is useful to me | 3.11 |
| 23 | if it does not require password or registration, I will think the information is useful to me. | 3.37 |
| 24 | if it is shown in more beautiful Web sites, I will believe in its usefulness. | 2.37 |

Based on the table, it is found that students used various and mixed searching strategies in using the internet. 7 strategies were indicated with high agreement by the students with mean value of more than 5.0. Students stated that they are able to compare information from different

websites (5.00), though they really hope to find a single website that contains the most relevant information related to their writing (5.32). Students also reported that they searched for other sources of information in order to validate the unknown information (5.16). This means that they want to get reliable sources of information when using the Internet, and they seem to be aware that there is unreliable information that may impact their quality of writing. In terms of authority, the students' choice of information sources is influenced by the credibility of the websites (5.05), and also recommendations by experts (5.11). In short, strategies that students employ in searching information on the Internet seem to be influenced by a few factors such as the comprehensiveness and relevance of information. This finding corresponds with Kuiper et al (2008) and Ozkanal et al. (2021) which reaffirm that in the process of information searching, the searching strategies learners employ may guide their searching behaviour on the Internet.

There are a few strategies less favoured or used by the students such as asking for others' opinions and exploring other printed materials in validating retrieved information. They seem to rely on the Internet as a primary source of information in performing written tasks. Students also do not seem to put much value on the graphic illustrations such as animations to attract them to use websites (3.42). Students also prefer to get information from websites that offer fast information retrieval and require no password and subscription. Based on these findings, students seem to place much value on information from the Internet. This may be because the Internet offers flexibility such as greater access to information regardless of time, place and cost. However, they are also aware that there may be information that may distract from their original purpose.

The strategies employed by the students seem to give hints to the kind of support that they need for online searching. Since students stated that they prefer looking for a single source that offers relevant information, a web portal or a repository is likely to be the answer. This is because a portal contains links to various types of information. Apart from that, students seem to place their trust on sites with credible authors/organisers to get reliable information. Therefore, the portal should contain evaluated links of free websites that are relevant for their writing. In addition, since credibility of the portal is also a main concern for the students, the possible solution could be to have a portal designed by the instructor with the design based on students' needs and their learning outcomes.

*Research Question 2: What types of information sources do students use in their writing?*
In the case of the types of information sources, findings revealed that students used various sources of information as shown in Figure 1 below.

**Table 2.0: Types of Information Sources Used in Writing**

| No | Purpose | Never | Rarely | Often | Every time |
|----|---------|-------|--------|-------|------------|
| | I want to look for... | | | | |
| 1 | content materials relevant to my topic | 0 | 0 | 10 | 9 |
| 2 | samples of writing related to the content my work | 0 | 0 | 11 | 8 |
| 3 | samples of writing that matches the format of my writing | 0 | 0 | 14 | 5 |

| 4 | grammar materials | 0 | 3 | 9 | 7 |
|---|---|---|---|---|---|
| 5 | citation materials | 0 | 6 | 5 | 8 |
| 6 | encyclopedia pages (e.g. wiki, etc) | 0 | 3 | 5 | 11 |
| 7 | online forum (e.g. ehow, etc) | 0 | 7 | 8 | 4 |
| 8 | online dictionary | 0 | 4 | 9 | 6 |
| 9 | online newspaper | 0 | 11 | 4 | 4 |
| 10 | online magazines | 2 | 9 | 4 | 4 |
| 11 | personal blogs | 3 | 6 | 6 | 4 |
| 12 | online libraries | 3 | 14 | 2 | 0 |
| 13 | online databases | 7 | 10 | 1 | 1 |
| 14 | online journals | 2 | 8 | 7 | 2 |
| 15 | file sharing sites | 13 | 1 | 4 | 1 |

The findings drawn from the checklist and the written reflections revealed that content is the most important factor that determines the students' choice of source. They sought for information that is relevant to their writing in terms of content and format. The students also need support in terms of proofreading such as grammar and citation help. This finding is very crucial as students need to focus on the quality of their writing. File sharing sites are the least used sources of information, may be due to lack of trust in the quality of information offered, and security risks. Other types of sources are consulted by the students as access to the sources is possible with the advancement of technology today compared to the past. This finding is not surprising as some sources are also similar to findings by Said et al. (2021) and Yunus et al., (2013) in which students were found to consult various online resources to accomplish their written tasks. Analysis in Table 3.0 below further supports the findings from Table 2.0.

**Table 3.0: Types of Internet Resources used in Students' Written Coursework**

| Types of Internet Sources | Frequency |
|---|---|
| Online newspaper, magazines | 61 |
| Content pages (specific websites) | 160 |
| Wiki pages/ encyclopaedia | 85 |
| Blogs, travel guides | 36 |
| Free essays, articles | 114 |
| Online Discussion Board/ Forum: e-how, ask.com | 30 |

Table 3.0 shows the types of information sources used by the students based on the reference lists of students' written coursework. The information sources matched their responses in written reflections. Based on this finding, there are several concerns as students were found sourcing their information from unscholarly and dubious sources such as free essays and articles (114), wiki pages (85). Therefore, for this study, the researchers should design the support by emphasizing on scholarly sources such as journals and research databases which students can use for academic purposes. Nevertheless, these findings offer insights into the actual types of information sources that students used in their writing. In designing the support, additional proofreading assistance can also be offered so that students can focus more on generating ideas for their writing instead of focusing too much time on the mechanics of writing.

## Conclusion

The results from the discussion are a promising start for the design of a TPACK development of support program to improve students' or the ESL pre-service teachers' online searching strategies. The findings further reiterate the integral role of technology, especially the Internet as students' primary source of information. The next stage will be getting comprehensive input from multiple perspectives such as different groups of pre-service teachers in order to contribute to students' TPACK development among ESL pre-service teachers to prepare them for the challenging and diverse teaching and learning environments.

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