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University EFL Students' Use of Online English Information Searching Strategy

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ABSTRACT

The purpose of this study was to investigate the online English information searching strategies (OEISS) used by university students studying English as a foreign language (EFL). Students' background characteristics were also examined to determine whether they influence the students' searching strategies. This study revised and used the Online Information Searching Strategy Inventory (OISS) developed by Tsai (2009). A survey questionnaire was administered to 537 university students recruited from 11 universities. The results indicated that the participants used OEISS at an average level. In addition, significant differences were found on how students used OEISS in developing their English reading ability, their purposes for online reading, and their time spent online. Moreover, contrary to previous findings, no significant difference was found between males and females in the use of OEISS. Lastly, the majority of students were found to avoid using disorientation strategies. This research provided information that compliments the present literature on OEISS for EFL university students.

Keywords: online information searching; online English information searching strategy (OEISS); university student; English as foreign language

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Introduction

Seeking and obtaining information for learning purposes over the Internet is prevalent among students; it requires a variety of searching skills to explore new topics in all subject domains (Monchaux, Amadieu, Chevalier, & Mariné, 2015; Tsai, Liang, Hou, & Tsai, 2012). It is also essential for students to know the search systems available for use and how each system works to acquire the information needed, and to extract and organize the relevant information for it to be utilized efficiently (Thatcher, 2008). Unfortunately, most students experience difficulties in searching for English information online and in effectively locating and evaluating information needed to accomplish their academic tasks (Kuiper, Volman, & Terwel, 2008). They often struggle in identifying keywords, evaluating results and their web source, deciding on what information to use and adjust the process of searching (Walraven, Brand-gruwel, & Boshuizen, 2008).

The use of effective online searching strategies has been broadly recognized to be necessary and is especially crucial for school-related tasks, especially for novice online learners (Tsai, 2009). However, it is often falsely assumed that learners born in the digital age have innate online information searching skills and are able to search the Internet effectively (Thompson, 2013). In fact, the digital generation may not be competent in searching for information online and their skills for searching information are yet to be developed. Some may not possess the knowhow in terms of locating and evaluating online materials, despite growing up with easy access to digital information and communication technologies (Athreya & Mouza, 2016). The information available online is often jumbled, non-sequential, and interactive (Bojović, 2016); thus, students need to change their searching habits and deal with fluid informational environments, which is very different from the traditional way of searching information. Furthermore, it is critical for students to locate and recognize useful materials online and to synthesize it into meaningful information (Ho, Kuo, & Lin, 2012). This is a challenge for most students because they need to regularly develop, confirm, and adjust their search while using different strategies in the process (Nazim, 2008).

The ability to effectively search, locate, and evaluate English online information has become an essential skill for university students, especially for those *whose first language* is *not English*. English as a foreign language (EFL) students require a longer amount of time to read English information when searching online (Tseng, 2010); therefore, they would need different strategies to obtain the information they need. It is apparent that there are two gaps in the existing literature: first, online information searching strategies have not been probed in the EFL field; and second, only a few have investigated individual differences in the use of online English information searching strategies (OEISS). Therefore, this study examined the use of OEISS by university EFL students and explored the differences in their strategies based on individual characteristics. The ability to utilize appropriate strategies while searching online for English information will help students obtain results more effectively and efficiently. Therefore, this study intended to answer he following two research questions:

a. What OEISS do university EFL students in Taiwan use?

b. What patterns of variation in OEISS use exist in terms of their background characteristics (age, gender, year of study, years of English learning experience, perceived English reading ability, purposes of reading online, and time spend on online reading)?

Review of Related Literature

Considerable research has investigated student's online information searching problems and issues (Lin & Tsai, 2007). Some researchers indicated that when students attempt to search for online information, they are often unable to identify the information source, search effectively, and critically evaluate the information obtained (Julien & Barker, 2009; Walraven, Brand-Gruwel, & Boshuizen, 2009). Antonenko and Niederhauser (2010) specified that searching information in a hypertext environment has raised several concerns, and disorientation is one of the major issues that students face. The vastness and complexity of information available in the Internet have increased the difficulty of the searching process and have caused the students to experience disorientation, which is almost never experienced with the traditional way of searching information in a library (Jing & Mi, 2010; Lee, 2005). According to Jing and Mi's (2010) study results, students were expected to use the strategies needed to access the Internet but these were seldom provided in the instruction.

Tsai et al. (2012) noted that "online information searching and processing is a complex cognitive process involving multifaceted cognitive and metacognitive strategies" (p.881). Research on online information searching strategies began in the 2000s which primarily investigated the factors that influence the use of searching strategies (Tsai et al., 2012). These factors include users' searching behaviors (Joho, Jatowt, & Blanco, 2015), prior domain-specific content knowledge (Monchaux et al., 2015; Sanchiz et al., 2017), user characteristics (Çevik, 2015), web experience and task performance (She, Cheng, Li, Wang, Chiu, Lee, Chou, & Chuang, 2012), epistemological beliefs (Çevik, 2015; Mason, Ariasi, & Boldrin, 2011), students' affective considerations (Kroustallaki, Kokkinaki, Sideridis, & Simos, 2015) and the nature of tasks or contexts (Laxman, 2010).

Prior to 2009, researchers studied the assessment and use of online searching strategies to enhance students' research skills on the Internet (Laxman, 2010; She et al., 2012; Tsai, 2009; Tsai et al., 2012; Wu & Tsai, 2005; Wu & Tsai, 2007). However most of these studies only had a small sample size (less than 100 participants). Then in 2009, Tsai (2009) recruited a sufficient number of participants consisting of 324 high school students and evaluated their strategies used by that later resulted with the Online Information Searching Strategies Inventory (OISSI). The OISSI provided educators an opportunity to understand their students' online searching abilities, suggested possible online-embedded scaffoldings for effective strategy uses, and pointed out the important factors that influence user's choice of online information searching strategy, such as gender and student's weekly online searching hours.

Previous studies (e.g., Tsai, 2009; Zhou, 2014) have found that differences in web searching patterns and behaviors between males and females exist. Males were found to be more successful searchers, frequent Internet users, and have utilized the Internet for a wider range of activities (Dixon, Correa, Straubhaar, Covarrubias, Graber, Spence, & Rojas, 2014). They were observed to be better at utilizing navigation patterns such as formulating queries, following up on hits, and filtering information in the search process, and is more likely to succeed in obtaining required information (Chen & Macredie, 2010; Kim, Lehto, & Morrison, 2007). Other researches have also explored gender and have found that it exerts a major influence on the selection of searching strategy to be used (Tsai, 2009; Tsai et al., 2012). The study by Tsai (2009) indicated that male high school students were better at using behavioral and procedural strategies than females. Meanwhile, Tsai et al. (2012) found that when searching online daily information, female university students demonstrated a significantly better behavioral strategy use. The latest research finding by Kurt and Emiroğlu (2018) showed that male university students used online information searching strategies more frequently than female students. Aside from gender, other factors such as differences between OEISS strategies and variations in its use based on students'

background characteristics have not been particularly focused on.

Theoretical Framework of the Study

A framework for analyzing OEISS has been developed and designed by Tsai and Tsai (2003) which categorized the searching strategies used by students on the Internet into seven aspects in three domains (shown in Figure 1). This framework was used by Tsai (2009) to create the Online Information Searching Strategies Inventory (OISSI) consisting of 25 searching strategies. Cronbach Alpha values were 0.88 for disorientation, 0.79 for evaluation, 0.79 for purposeful thinking, 0.82 for trial and error, 0.75 for selecting main ideas, 0.74 for control, and 0.64 for problem solving, with a total reliability coefficient of 0.91. The total explained variance of factor analysis was 68%. The present study adopted this model because of its high reliability in profiling university EFL students' use of OEISS and to investigate the influence of background characteristics on their use. The seven aspects of OEISS used in this study are defined below:

a. Control aspect (CON): skills required for employing online searching strategies to obtain English information.
b. Disorientation aspect (DIS): self-awareness of searching orientation when searching English information online.
c. Trial & error aspect (TE): skills required for utilizing different online English information searching approaches.
d. Problem solving aspect (PS): skills and commitment to solve problems and issues encountered from searching English information online.
e. Purposeful thinking aspect (PT): skills required to execute self-monitoring of online English information searching.
f. Select main ideas aspect (SMI): skills needed to recognize main concepts of English information searched online.
g. Evaluation aspect (EVA): skills required to evaluate and unify English information obtained online.

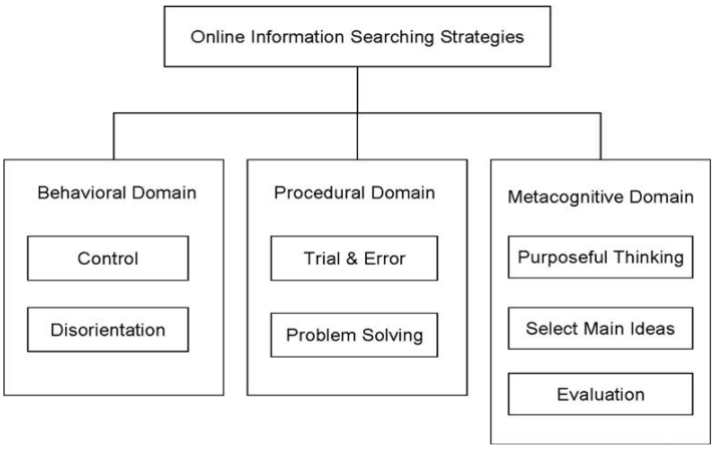

Figure 1. Tsai and Tsai's (2003) Model of Online Information Searching Strategies (OISS)

Method

Participants

Five hundred thirty seven undergraduate students enrolled in a variety of programs with 30-60 students in each class from 13 universities in Taiwan were recruited as participants of this study. University upperclassmen in countries such as Taiwan where English is not the native language, are more likely to be capable of online English information searching for academic papers, presentations, and other class assignment purposes; therefore, the questionnaires were only distributed to junior and senior level students. These students had already studied EFL for at least 10 years and were preparing for their Test of English for International Communication (TOEIC) tests to meet the graduation requirement at the time of the research. The participants were 54.4% male and 45.6% female, aged between 21 and 24 (M = 21.64; SD = 0.803). A total of 46.4% were juniors and 53.6% were seniors. In general, they had more than 11 years of English learning experience and had an average score in perceived English reading ability. Most of them answered *somewhat agree* in the academic purpose of reading online contents (M = 3.63), and *somewhat disagree* in online searching mainly for daily life needs (M = 3.31). Most of them spent approximately 2 to 3 hours of online reading per day. The background characteristics are provided in detail in Table 1.

Table 1
Descriptive Statistics of Background Characteristics (Complete Sample)

Variables	*M*	*SD*	*Min*	*Max*
Gender[a]	1.46	0.499	0	1
Age	21.64	0.803	21	24
Year of study[b]	3.54	0.499	1	2
YELE	11.63	2.204	10	18
PERA[c]	3.31	0.890	1	5
PODLN [d]	3.63	1.277	4.19	1.41
POA[d]	3.78	1.391	2.79	1.80
TSPRPD [e]	2.96	1.455	1	6

Note. N = 537 students.
YELE=years of English learning experience; PERA=perceived English reading ability; PODLN= reading online mostly for daily life needs; POAP= reading online mostly for academic purpose; TSPRPD=time spend on online reading per day
[a]male = 0, female = 1.
[b]junior = 1, senior = 2.
[c]very poor = 1, poor = 2, on average = 3, good = 4, very good = 5.
[d]strongly disagree = 1, disagree = 2, somewhat disagree = 3, somewhat agree = 4, agree = 5, strongly agree = 6.
[e]less than 1 hour = 1, 1 to 2 hours = 2, 2 to 3 hours = 3, 3 to 4 hours = 4, 4 to 5 hours = 5, more than 5 hours = 6.

Instrument

Tsai's (2009) complete version of OISSI was modified into OEISS inventory for the survey questionnaire used in this study, which was distributed to university EFL students. The following steps were performed to develop the survey questionnaire:

a. Related studies, books, and references were reviewed.
b. A total of 13 students were interviewed for pre-testing.
c. Each item of the survey questionnaire was reviewed and evaluated.
d. Experts' opinions were obtained to meet the content validity of the survey questionnaire.
e. The revised survey questionnaire was translated from English to Chinese.
f. Pilot testing was done with 194 students to assess the survey questionnaire's level of reliability.

The three domains of the OISSI consisting of seven aspects comprised the first part of the survey; it contained 25 items which examined the students' usage of OEISS. The participants were instructed to score each item using a six-point Likert scale (1 = "not at all like me" and 6 = "very much like me"). The term *information* was specified as *English information* to better fit the purpose of the current study. Further, one item was updated from "I know how to use a web browser, *like IE or Netscape*" to "I know how to use a web browser *like IE, Chrome, Microsoft Edge, Safari or Firefox*". The second part including 8 items intended to obtain personal information.

The construct validity and the exploratory factor analysis of the OEISS inventory were performed on the seven factors with a total explained variance of 51.756%. The Cronbach's alpha reliability scores were 0.902 for the total, and 0.698, 0.789, 0.795, 0.605, 0.834, 0.810 and 0.836 for the seven subscales namely CON, DIS, TE, PS, PT, SMI, and EVA, respectively. The final survey questionnaire was administered to students during class hours by their instructor.

Data Collection and Analysis

Before conducting the survey, the purpose of the study and the data collection procedures were explained in detail via e-mail, telephone, and/or in person to 13 professors who agreed to administer it. Students were asked to complete the questionnaire while at school during regular class time. To answer the research questions, the descriptive data and Pearson correlation coefficient were calculated. Moreover, one-way ANOVA was used to analyze whether significant variations across the entire OEISS exist in relation to background characteristics. The Scheffe posthoc test was performed to detect if any significant differences exist in each background characteristic group. The χ^2 tests were also performed to evaluate all OEISS items to determine if there are significant variations in terms of background characteristics.

Results

Trends and Patterns in OEISS of University EFL Students in Taiwan

The students' scores using the 6-point Likert scale for each OEISS item ranged from 3.69 to 5.39. As shown in Table 2, the participants' usage for each OEISS was average (M = 4.34, SD = 0.67). This indicates that most students use normal range and balanced OEISS according to Tsai and Tsai (2003). In addition, procedural domain strategies were most frequently used by students and

the ones relevant to behavioural domain were used the least. Among the seven strategies, the results revealed that the participants used CON most frequently and DIS the least. Further analysis of students' responses on all items of the survey showed that the CON under behavioural domain and TE under procedural domain were used mostly, whereas the DIS was used the least.

Table 2
Mean and Ranking Profile for the Three Domains and Seven OEISS Categories

OEISS Categories	*M*	*SD*	Ranking
Behavioral Domain	4.28	0.824	
CON	4.72	0.889	1
DIS	3.86	1.214	7
Procedural Domain	4.52	0.788	
TE	4.63	0.940	2
PS	4.41	0.887	3
Metacognitive Domain	4.26	0.813	
PT	4.21	0.876	5
SMI	4.33	0.914	4
EVA	4.24	0.913	6
Overall OEISS	4.34	0.672	

The Patterns of Variation in OEISS Use in Terms of Students' Background Characteristics

Differences on Gender and Year of study

As illustrated in Table 3, the results of the independent samples t-test showed that no significant difference was found between males and females, and between junior and senior students' use of OEISS. The results also showed that the strategies were utilized by males and females, and junior and senior students in similar frequencies.

Table 3
Independent Samples t-test Results Comparing Males and Females, and Junior and Senior Students on OEISS Use

		N	*M*	*SD*	*F*	*t*	*p*
Gender	Male	292	4.348	0.709	2.395	0.425	0.122
	Female	245	4.323	0.628			
Year of study	Junior	229	4.343	0.650	0.421	0.201	0.517
	Senior	276	4.331	0.691			

Note. N =537; $p < 0.05$

Role of Age, Years of English Learning Experience, Perceived English Reading Ability, Purposes of Reading Online, and Online Reading Experience

The results of one-way ANOVA (shown in Table 4) revealed no significant difference was found among students in terms of participants' age, years of English learning experience, use of online English information searching, and frequency of OEISS utilization. However, students' PERA, PODLN, POAP, and TSPRPD had significant effects on the frequency of each OEISS use ($p <$ 0.05).

The posthoc Scheffe test results verified that there was a positive variation on the frequency of strategy use in students with high level of PERA ($p < 0.05$). The test also confirmed that the frequency of strategy use was high regardless of the purpose of searching English information (either PODLN or POAP). In addition, the results showed that students' strategy use increased as TSRPD increased.

Table 4
Variations in the Use of OEISS in Relation to Background Characteristics

	SS	*df*	*MS*	*F*	*Sig.*	*Comments*
Age	67.832	69	.983	1.034	0.377	
YELE	311.585	67	4.651	0.401	0.848	
PERA	76.152	68	1.120	15.271	0.000*	Good>very good>average >poor>very poor
PODLN	169.729	69	2.460	9.660	0.000*	6>5>4>3>2>1[a]
POAP	172.017	69	2.493	8.476	0.000*	6>5>4>3>2>1[a]
TSPRPD	199.892	69	2.897	2.283	0.045*	6>5>4>3>2>1[b]

Note. N =537; $p < .05$

Descriptive statistics for the above background characteristics that have significant differences on overall OEISS use are provided in Table 5.

Table 5
Descriptive Statistics of Overall OEISS Use and Students' Background Characteristics

	Mean and SD											
PERA[a]	1		2		3		4		5			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*		
	3.81	.79	4.21	.57	4.27	.84	4.43	.59	4.71	.76		
PODLN[b]	1		2		3		4		5		6	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
	3.76	.91	4.20	.81	4.25	.66	4.30	.62	4.52	.56	4.71	.60
POAP[c]	1		2		3		4		5		6	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
	3.95	1.01	4.24	.59	4.15	.72	4.26	.721	4.51	.57	4.64	.68
TSPRPD	1		2		3		4		5		6	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
	4.20	.69	4.23	.77	4.32	.65	4.39	.69	4.46	.59	4.49	.77

Note. N =537.
[a]Very poor=1, poor=2, average=3, good=4, very good=5.
[b]Strongly disagree=1, disagree=2, somewhat disagree=3, somewhat agree=4, agree=5, strongly agree=6.
[c]less than 1 hour=1, 1 to 2 hours=2, 2 to 3 hours=3, 3 to 4 hours=4, 4 to 5 hours=5, more than 5 hours=6.

Variations in the Use of Each OEISS

The mean of each OEISS item was computed in terms of PERA, PODLN, POAP, and TSPRPD. The $\chi 2$ tests showed that 24 of the 25 OEISS items had statistically significant differences in frequency of use in terms of PERA. The frequencies of strategy use are listed in Table 6 in descending order. None of the OEISS items revealed negative variation. There were similarities in the frequency of strategy use among the five levels of PERA. The results indicated that the five groups shared 7 of the 10 most used searching strategies. The three most frequently used across all five groups of PERA were Item 1 (*I know how to use a web browser, like IE, Chrome, Microsoft Edge, Safari or Firefox*), Item 3 (*I know how to utilize advanced-search functions provided by search engines*), and Item 10 (*I try other English databases when I cannot get any information in one database*). The first two were CON strategies and the last one was TE strategy.

Table 6
Strategies with Significant Positive Variation in Terms of PERA

Aspect	# of item	% high use (4, 5 or 6)					χ^2
		5	4	3	2	1[a]	
DIS	7	83	55	76	41	34	98.99
EVA	22	90	89	88	80	55	80.52
EVA	24	88	87	82	82	70	78.70
CON	2	94	82	76	74	60	78.04
PT	16	94	84	81	74	52	74.90
SMI	19	88	87	82	82	70	74.65
SMI	21	94	84	81	74	52	73.31
EVA	25	94	85	82	74	66	72.84
SMI	20	83	89	71	73	50	72.28
PT	15	87	77	76	68	47	70.37
CON	4	85	80	82	76	50	70.09
PT	17	90	89	88	80	55	66.14
PS	13	94	91	76	88	66	64.93
PS	14	94	93	65	91	76	61.61
DIS	8	80	68	75	49	44	60.37
TE	10	90	93	65	93	73	56.62
EVA	23	79	79	82	68	55	52.97
DIS	6	87	69	59	59	58	51.70
CON	1	94	96	65	95	94	48.10
DIS	5	80	57	69	48	50	47.97
TE	9	92	90	59	86	66	47.89
PT	18	79	79	82	68	55	38.76
CON	3	87	89	71	87	82	35.70
PS	12	81	69	76	70	58	32.44

Note. Critical Value of $\chi^2 = 62.91$ ($df = 20$); $p < 0.05$.
[a]Very poor=1, poor=2, average=3, good=4, very good=5.
N=537, missing=8 (1=50; 2=148; 3=17; 4 =262; 5=52)

Participants in the five groups of PERA were also inclined to avoiding the use of certain OEISS. The least used items (mean score lower than 3.89) were mostly related to students' self-awareness of their searching orientation (DIS) which are: Item 5 (*I know how to log-in on a specific English website with its URL*), Item 7 (*I always feel lost while searching English information on the Internet*), and Item 8 (*I do not know what to do when I search English information on the Internet*).

Differences were also found in the use of each OEISS among the five groups of PERA. Item 21 (*I look through titles or hyperlinks in a web in order to obtain important English information*), the strategy with high frequency usage ($M = 4.75$) by students with high PERA, had lower frequency usage ($M = 3.82$) by students in the low PERA group. In addition, three PT strategies were less preferred by students with low PERA; these were Item 16 (*I think of how I can utilize the searched English information*), Item17 (*I usually ascertain my goals first before starting my online English searching*), and Item 15 (*I keep on reminding myself of the purpose for searching English online*).

The χ^2 test results showed that 22 of the 25 OEISS had statistically significant differences in their frequency of use in terms of PODLN. These 22 strategies are listed in Table 7 in descending order. None of the OEISS had a negative difference. There were similarities in the use of OEISS among the six levels of PODLN; they shared 6 of the 10 most used searching strategies. The three most frequently used OEISS were Item 13 (*I do my best to resolve any problems encountered during a search*), Item 10 (*I try other English databases when I cannot get any information in one database*), and Item 14 (*I think of some resolutions when I am frustrated with problems in searching*). These are CON, TE, and PS strategies, respectively.

Table 7
Strategies with Significant Positive Variation in Terms of PODLN

Aspect	# of item	% high use (4, 5 or 6)						χ^2
		6	5	4	3	2	1[a]	
PT	17	52	74	86	77	87	98	112.90
SMI	19	58	83	84	76	91	98	88.61
PT	16	43	77	80	74	87	93	87.10
PT	15		62	73	70	78	93	84.51
EVA	25	55	68	83	76	87	98	84.14
SMI	21	55	65	83	71	90	98	78.12
EVA	22	39	74	79	71	85	100	74.87
DIS	7	50	37	56	44	57	48	72.79
TE	9	65	89	89	81	86	88	71.34
EVA	23	55	71	80	70	87	88	67.42
PS	14	68	80	89	90	95	100	61.00
PS	12	61	60	68	74	75	71	60.30
CON	2	58	65	79	79	85	86	59.20
EVA	24	45	63	74	66	83	93	58.90
TE	10	68	94	89	90	91	100	58.61
PS	13	74	69	88	83	93	98	55.99
SMI	20		77	81	76	86	86	54.76
PT	18	52	71	75	63	77	95	49.78
DIS	5	61	51	58	53	61	44	43.31
DIS	6	58	54	67	68	72	71	42.49
CON	4	65	63	79	70	85	76	42.22
DIS	8	0	57	60	61	68	69	40.17

Note. Critical Value of $\chi^2 = 65.84$ ($df = 20$); $p < 0.05$.
N=537, missing=3 (1=31; 2=35; 3=238; 4=70; 5=118; 6=42)
[a]Strongly disagree=1, disagree=2, somewhat disagree=3, somewhat agree=4, agree=5, strongly agree=6.

Participants in the six groups of PODLN were also inclined to avoid using certain OEISS (mean score lower than 3.89). These strategies were mostly regarding students' self-awareness of their searching orientation (DIS). These were Item 5 (*I know how to log-in on a specific English website with its URL*), Item 7 (*I always feel lost while searching English information on the Internet*), and Item 8 (*I do not know what to do when I search English information on the Internet*).

Differences were found in the use of each OEISS among the six groups of PODLN. Item 22 (*I think of how I can present and organize the English data that I have searched from the web*), an EVA strategy with high frequency usage ($M = 4.75$) by students with high level of PODLN, had low frequency usage ($M = 3.82$) by students with low level of PODLN. In addition, one EVA strategy and two PT strategies were least preferred by students with low level of PODLN, which were Item 24 (*I compare English information that has been collected from different websites*), Item 16 (*I think of how I can utilize the searched English information*), and Item 15 (*I keep on reminding myself of the purpose for searching English online*).

The χ^2 test results showed that 21 of the 25 OEISSs had statistically significant differences in the frequency of use of strategies in terms of POAP. These strategies are listed in descending order in Table 8. There were similarities in the frequency of use in terms of POAP. The results indicated that these six groups shared 3 of the 10 most used searching strategies, which were Item 3 (*I know how to utilize advanced-search functions provided by search engines*), Item 9 (*I try some possible entrance websites when I cannot find enough English information*), and Item 13 (*I do my best to resolve any problems encountered during a search*); these were CON, TE, and PS strategies, respectively.

Table 8
Strategies with Significant Positive Variations in Terms of POAP

Aspect	# of item	% high use (4, 5 or 6)						χ^2
		6	5	4	3	2	1[a]	
SMI	19	53	79	83	84	90	94	108.86
PS	14	68	85	88	89	95	95	97.38
PT	17	62	82	83	76	88	89	89.69
PT	16	53	73	79	74	85	89	89.53
TE	10	67	85	89	79	95	100	88.64
EVA	22	59	70	76	74	88	81	78.92
SMI	20	62	76	76	81	89	81	77.64
EVA	24	59	82	73	68	78	78	73.87
DIS	7	48	39	53	63	53	52	70.88
PS	12	62	64	67	76	74	72	69.45
PT	15	56	63	71	61	80	84	68.59
SMI	21	59	85	81	82	87	81	68.42
PT	18	59	63	73	65	80	81	64.43
EVA	25	62	79	80	76	90	86	59.32
DIS	5	53	59	57	54	56	55	53.90
TE	9	53	82	81	68	74	56	53.77
CON	2	53	73	81	74	82	84	53.09
EVA	23	59	84	75	79	87	84	52.08
CON	3	76	82	90	71	90	91	49.03
CON	4	68	70	78	68	79	81	47.55
DIS	8	48	55	62	71	61	67	46.37
PS	13	79	76	87	76	92	94	45.74
DIS	6	59	56	65	65	71	76	40.25

Note. Critical Value of $\chi^2 = 67.28$ ($df = 20$); $p < 0.05$.
[a]Strongly disagree=1, disagree=2, somewhat disagree=3, somewhat agree=4, agree=5, strongly agree=6.
N=537, missing=1 (1=34; 2=33; 3=222; 4=38; 5=145; 6=64)

Participants in the six groups of POAP were also inclined to avoid using two OEISS (mean score lower than 3.78). These strategies were mostly regarding students' self-awareness of their searching orientation when searching English information online (DIS). These were Item 5 (*I know how to log-in on a specific English website with its URL*) and Item 7 (*I always feel lost while searching English information on the Internet*).

Differences were found in the use of each OEISS among the six groups of POAP. Item 19 (*I usually think about what English keywords I can use in advance*), a SMI strategy with high frequency usage ($M = 5.08$) by students in the high POAP group, and Item16 (*I think of how I can utilize the searched English information*), a PT strategy, were used with comparatively lower frequency ($M = 3.62$) by students in the POAP group.

The $\chi 2$ test results showed that only 8 of the 25 OEISS showed statistically significant differences in frequency of use in terms of TSPRPD. These strategies are listed in Table 9 in descending order. There were similarities in the frequency of OEISS use among the six levels of TSPRPD. The results indicated that these six groups shared 3 of the 8 most used strategies namely Item 19 (*I usually think about what English keywords I can use in advance*), Item 16 (*I think of how I can utilize the searched English information*), and Item 4 (*I know how to log-in on a specific English website with its URL*). These were SMI, PS, and CON strategies, respectively.

Participants in the six groups of TSPRPD were also inclined to avoid using Item 7 (*I always feel lost while searching English information on the Internet; M* = 3.78), which is a DIS strategy. Further, no significant difference was found for each OEISS usage among the six groups; that is, both high and low TSPRPD groups preferred the same strategies.

Table 9
Strategies with Significant Positive Variation in Terms of TSPRPD

Aspect	# of item	% high use (4, 5 or 6)						χ^2
		6	5	4	3	2	1[a]	
CON	2	68	80	80	88	75	79	45.68
CON	4	73	77	78	81	75	74	44.45
DIS	6	57	68	64	76	65	81	47.50
DIS	7	44	57	43	57	59	68	57.80
DIS	8	54	66	58	60	66	74	39.62
PT	15	63	76	78	71	61	77	51.24
PT	16	71	77	82	87	88	79	41.42
SMI	19	77	81	89	87	88	90	37.84

Note. Critical Value of χ^2=45.69 (df = 20); $p < 0.05$.
N=537, missing=3 (1=105; 2=158; 3=125; 4=75; 5=32; 6=39)
[a]less than 1 hour=1, 1-2 hours=2, 2-3 hours=3, 3-4 hours=4, 4-5 hours=5, more than 5 hours=6.

Discussion

The results of this study revealed that the frequency of OEISS use by students was mainly average. The EFL learners' overall mean score for strategy use in the present study was similar to that of junior and senior students majoring in Information Management in Tsai et al.'s study in 2012. This indicates that most students managed to use a variety of strategies in retrieving online English information.

For background characteristics and OEISS use, the findings of this study indicated that gender does not have any effect on the utilization of OEISS by Taiwanese EFL university students. This is in contrast with the results of previous researches which recognized gender as an important influencing factor for Internet usage and online searching behaviors (Chou & Tsai, 2007; Keasar, Baruch, & Grobgeld-Dahan, 2005). The study by Tsai et al. (2012) also showed that significant difference between search context and gender on students' use of online searching strategies exists. A possible explanation for this is that gender stereotyping is declining for the new generation, as mentioned by Volman, Van Eck, Heemskerk, and Kuiper (2005). This is reflected in the fact that even though the Internet has been traditionally recognized as a male activity, females now gain more experiences and feel more comfortable toward using the Internet (Tsai & Tsai, 2010). In addition, the current study explored the searching strategies for online English information and showed that male and female students do not differ in the use of searching strategies when the language used online is not their native language. The disparity in the results between the present study and previous studies in terms of the effect of gender needs further investigation through in-depth interviews to better understand this particular result.

The underlying patterns of OEISS usage suggested that learners with high PERA frequently use OEISS to search English information online in order to utilize available resources. Furthermore, the purpose of reading online showed significant influence on the frequency of OEISS use among learners regardless of whether they read online mostly for daily life needs or for academic purposes. In addition, the results showed that students' OEISS use increased as time spent on online reading per day increased. It appears that when students spend more time reading online, they use more OEISS. Therefore, it would be beneficial for students if they are encouraged to spend more time reading online by their teachers.

The possibility that effective use of OEISS might contribute to successful information gathering is exciting. Laxman (2010) explored the application of Internet information search strategies to well- and ill-structured problem solving. It was found that it is necessary to employ strategies when searching for information over the Internet to solve problems; training was also found to be necessary and required prior to the search. University professors could consider incorporating the

findings of this and similar studies into strategy awareness programs so that the potential benefits of OEISS use could be gained by students. It is recommended that future studies consider using both quantitative and qualitative approaches to explore students' online searching process and how individual searching strategies are used.

Conclusion

The main purposes of this study were to identify university EFL students' use of OEISS and to explore the trend and pattern of its use among students. For this purpose, OEISS, a self-reported survey instrument developed by Tsai (2009) with 25 items consisting of 3 domains and 7 aspects, was modified and used in this study. The main findings suggest that students used OEISS at a medium level. The most frequently used strategy was the control strategy (CON), and the least used was disorientation strategy (DIS). The factors that mostly influenced students' use of OEISS were perceived English reading ability, purpose of reading English online, and time spent on online reading.

Most participants were inclined to avoid using OEISS related to self-awareness of searching orientation when searching English information online (DIS) regardless of the individual's background characteristics. Further, SMI strategies were preferred by the group with high PERA and with high POAP, and EVA strategies were preferred by the group with high PODLN. Meanwhile, PT strategies were less preferred by the group with low PERA and with high POAP. This study extended the knowledge currently available in existing literature on the topic of web searching strategy by exploring English online information searching strategies. The findings showed that using OEISS provides significant support when searching for information on the web, especially when seeking information for academic purposes by university EFL students. The implications are that OEISS plays an important role when students are required to locate information online. Therefore, there is a need to strengthen the students' knowledge of strategies that can be used and this should be by offering OEISS instruction for university EFL students. It should also be noted that a limitation of this study was that it involved only samples from Taiwan, future research may compare a variety of samples to further investigate the differences of OEISS uses across countries.

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Appendix 1
Items of Online English Information Searching Strategy (OEISS)

Aspect	Item	
CON	1.	I know how to use a web browser, like IE, Chrome, Microsoft Edge, Safari or Firefox.
CON	2.	I look through the English titles or hyperlinks in order to get the main ideas in a webpage.
CON	3.	I know how to utilize advanced-search functions provided by search engines.
CON	4.	I know how to log-in on a specific English website with its URL.
DIS	5.	I always feel nervous when I search Engish information on the Internet.
DIS	6.	I do not know how to start my online English searching.
DIS	7.	I always feel lost while searching English information on the Internet.
DIS	8.	I do not know what to do when I search English information on the Internet.
TE	9.	I try some possible entrance websites when I cannot find enough English information.
TE	10.	I try other English databases when I cannot get any information in one database.
TE	11.	I try some other search engines when my search is not successful.
PS	12.	I usually give up searching when I come up with unsolved problems.
PS	13.	I do my best to resolve any problems encountered during a search.
PS	14.	I think of some resolutions when I am frustrated with problems in searching.
PT	15.	I keep on reminding myself of the purpose for searching English online.
PT	16.	I think of how I can utilize the searched English information.
PT	17.	I usually ascertain my goals first before starting my online English searching.
PT	18.	Sometimes, I stop and think about what English information I still lack.
SMI	19.	I usually think about what English keywords I can use in advance.
SMI	20.	I select the main ideas provided in each English webpage as much as possible.
SMI	21.	I look through titles or hyperlinks in a web in order to obtain important English information.
EVA	22.	I think of how I can present and organize the English data that I have searched from the web.
EVA	23.	I keep on evaluating the relationships among the English information searched from the web.
EVA	24.	I compare English information collected from different websites.
EVA	25.	I decide if the English information provided in a website is credible to be used as a reference.

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