An Exploratory Study of Students' Information Literacy Self-efficacy

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ABSTRACT

The current study focuses on students' information literacy self-efficacy and investigates whether students estimate that they know how to handle and evaluate the vast amount of information they find on the Internet. The objectives of this study are to explore: (1) to what extent does the openness to experience variable explain students' information literacy self-efficacy? (2) to what extent do the cognitive appraisals threat and challenge explain students' information literacy self-efficacy? (3) To what extent does the variable of motivation explain students' information literacy self-efficacy? The research was conducted in Israel during the spring semester of the 2017 academic year and involved 136 students. Researchers used five questionnaires to gather data. Findings suggested that the personality characteristics of openness to experience, as well as threat and challenge, and motivation predicted students' information literacy self-efficacy.

Key Words: Cognitive appraisals, exploratory study, information literacy, motivation, openness to experience, self-efficacy

Introduction

The term information literacy (IL) has developed since its inception in 1974 when Paul Zurkowski, the first to use the phrase *information literacy*, suggested that information-literate people know how to use information resources in their workplace (Zurkowski, 1974). Librarians have been the primary profession to deal with the topic of IL. The Association of College and Research Libraries (ACRL) (2000) have stressed the importance of IL as a set of essential skills for society in general and in particular for students in higher education.

In 2016, the ACRL presented a new *Framework* for IL in higher education, which replaced previous standards (2000). This *Framework* is based on a cluster of interconnected core concepts, with flexible options for implementation, rather than on a set of standards or learning outcomes. The *Framework* is organized into six frames, each consisting of a concept central to information literacy, a set of knowledge practices, and a set of dispositions. The frames are: (1) authority is constructed and contextual, (2) information creation as a process, (3) information has value, (4) research as inquiry, (5) scholarship as conversation, and (6) searching as strategic exploration.

Statement of the Problem

A lot of research has been carried out investigating the topic of IL and academic performance. Yet, less attention has been devoted to the nature and acquisition of self-efficacy

in IL. The term self-efficacy is one of the main constructs of Bandura's (1986) social cognitive theory and refers to a person's estimation of his/her ability to accomplish a particular goal. Bandura (1986) states that the level of self-efficacy is associated with one's emotional reaction to challenges and to the amount of time and effort that one is ready to devote. Individuals with low self-efficacy are not sure about their capability, they usually respond to new tasks with anxiety, may avoid challenges, thus, they may fulfill their self-made prediction of failure.

Some studies have focused on the topic of IL self-efficacy. Stokes and Urquhart (2011) found out that IL self-efficacy was low during the first year of college, increased in the second year and then remained unchanged. They also inferred that IL self-efficacy increased in the first and second levels of a student's program, before decreasing in the research-intensive third level. Other researchers concluded that IL self-efficacy is a significant predictor of students' academic achievement.

The current study focuses on students' IL self-efficacy and uses one personality characteristic derived from the Big Five theory of personality (openness to experience), the cognitive appraisals threat and challenge, and the variable of motivation, and attempts to predict how these variables influence students' IL self-efficacy.

The objectives of this study is to investigate: (1) to what extent does the openness to experience variable explain students' IL self-efficacy? (2) to what extent do the cognitive appraisals threat and challenge explain students' IL self-efficacy? and (3) to what extent does the variable of motivation explain students' IL self-efficacy? The research may contribute to a theoretical understanding of the variables that influence students' IL self-efficacy and may lead to further inquiry in this field.

Literature Review

Openness to experience

Based on the professional literature, researchers assumed that personality characteristics may influence students' IL self-efficacy. Hence, the following section will focus on the openness to experience characteristic derived from the "Big Five" model.

The Big Five model of personality is one of the most researched measures of personality structure in recent years and is regarded as a comprehensive model that includes five main factors representing personality traits: neuroticism, extraversion, agreeableness, openness to experience, and conscientiousness. Numerous researchers have examined the model, finding validity and reliability across gender, age, and cultural lines. This article focused on one personality characteristic: openness to experience and addressed the complexity and depth of the person's mental and experiential life, and consists of curiosity, creativity, and preference for novelty. Openness to experience is associated with cognitive flexibility and with quick adjustment to dynamic environments (Devaraj et al., 2008). Several researchers have suggested that an open-minded person tries to discover new perspectives, is curious, likes to study (Komarraju et al., 2011), and that this characteristic affects self-efficacy.

Various studies have demonstrated a relationship between openness to experience and information seeking (Halder et al., 2010). Kwon and Song (2011) suggested that students who are more open to experience tended to be able to evaluate information and use relevant strategies in their information-seeking process. Their study also showed that female students were more open to experience than their male counterparts. In addition, Heinström's (2014) study suggested that students who were open to experience enjoyed exploring information. In a recent

study, researchers found that the more open to experience students are, the higher their IL level. Based on the literature, researchers assumed that openness to experience may predict students' IL self-efficacy. Thus, the underlying assumption of this study is:

- $H_{(1)}$. The more students are open to experience, the higher their IL self-efficacy.

Cognitive appraisal: Threat versus challenge

Another variable that may affect students' IL self-efficacy is the variable of cognitive appraisal. Cognitive appraisal refers to the person's evaluation of events vis-à-vis his or her well-being. It has been suggested that when a person encounters a situation that threatens an important action, he or she experiences a specific cognitive process. The person evaluates the demands of the environment (primary appraisal) and chooses one of his/her resources to cope with the situation (secondary appraisal). A challenge appraisal implies that the demands of the stressful situation can be overcome, and that the individual assumes that there is a potential for gain or benefit. It was also suggested that the emotions associated with challenge are happiness, excitement, and joy.

On the other hand, threat occurs when the person realizes that resources do not meet situational demands. Threat is followed by potential danger to the individual's self-esteem and self-being. Studies showed that individuals who are in a threat state experience anxiety in social or stressful situations, such as tests or sports and anticipate failure or negative evaluations. Researchers propose that challenge and threat are context bound and occur only in motivated performance situations such as delivering a speech, exams, or sport competitions. Numerous studies show that a challenge state helps performance, while a threat state slows it down. Several studies were carried out in the educational environment. A study (Putwain et al., 2015) findings showed that challenge and threat influenced attainment value and academic self-efficacy.

Assuming that nowadays when students confront vast amounts of information, threat and challenge are variables that may predict their IL self-efficacy, the following hypotheses can be made:

- $H_{(2)}$. The more threatened students are, the lower their IL self-efficacy.
- $H_{(3)}$. The more challenged students are, the higher their IL self-efficacy.

A further variable that may influence students' IL self-efficacy is their motivation.

Motivation

Motivation has been found to be an essential factor of general behavior, IT acceptance and work-related behavior (Lu, 1999).

Deci and Ryan (1985) introduced several types of motivation: autonomous (intrinsic), controlled (extrinsic), and lack of motivation (a motivation). Intrinsic motivation is the inclination to search for challenges in order to learn, and is followed by the satisfaction stemming from the experience of engaging in an activity for its own sake. Extrinsic motivation mirrors a behavior that involves external demands or rewards through a sense of obligation. A motivation is associated with a lack of motivation to act. The person feels a sense of futility in his/her actions, or a feeling that the activity is without value.

Various researchers focused on the importance of motivation to academic achievement and performance, as well as to IL acquisition (Kuhlthau, 2004). Deci et al. (1991) who

investigated how learning strategies and motivational factors predicted information literacy self-efficacy of e-learning students, noted that the use of met cognitive learning strategies, increases both information literacy self-efficacy perception and self-efficacy belief. They also suggested that both intrinsic and extrinsic motivations were associated with positive academic performance. Benware and Deci (1984) reported that students who were engaged with the course materials had higher levels of intrinsic motivation. Further, they noted that female students tended to be more extrinsically motivated than male students, and male students tended to be more a motivated than female students.

The current study focused on students' motivation to study at the university, assuming that this motivation may influence their IL self-efficacy.

Based on the literature review the following hypotheses were developed:

- $H_{(4)}$. The higher students' intrinsic motivation to study at the university is, the higher their IL self-efficacy.
- $H_{(6)}$. The higher students' motivation to study at the university is, the lower their IL self-efficacy.
- $H_{(5)}$. The higher students' extrinsic motivation to study at the university is, the lower their IL self-efficacy.

Method

Data collection

The research was conducted in Israel during the spring semester of the 2017 academic year and involved 136 students from the Information Science Department at Bar-Ilan University. Researchers received permission from the head of the department to enter four classes in order to explain the study's purpose and emphasize that the questionnaire required only 15 minutes to complete. The four classes had 145 students and 136 responses were received, giving a reply percentage of 93.7%.

Data analysis

However, 136 participants, 37 (27.2%) were male and 99 (72.8%) were female. Their average age was 30.5 years (*SD*=9.82). As for their enrollment by educational level, 88 (64.7%) were undergraduates, and 48 (35.3%) were graduate students. The majority of the students were studying information science (92%), while the rest were studying other disciplines and took general courses in the Information Science Department.

Measures

Researchers used five questionnaires to gather personal details: A demographic questionnaire, the information literacy self-efficacy questionnaire, the openness to experience questionnaire, a cognitive appraisal questionnaire measuring threat versus challenge, and an academic motivation scale (see Appendix A). The demographic questionnaire contained four questions concerning age, gender, education level, and student's major discipline.

The information literacy self-efficacy questionnaire was shortened and modified for the current study and contained 26 questions that measured perceived information problem solving skills among university students. The statements were rated on a 7-point Likert scale (1=

strongest disagreement; 7= strongest agreement). Its Cronbach's alpha in this study was 0.95. Since the items were measured as quasi-interval variables, the mean of all the items was calculated into the variable IL self-efficacy, which is the dependent variable.

The openness to experience questionnaire was derived from the Big Five questionnaire (John et al., 1991) and consisted of eight statements rated on a 5-point Likert scale (1= strongest disagreement; 5= strongest agreement). After reversing item 6, the Cronbach's alpha was 0.78. Since the items were measured as quasi-interval variables, the mean of all the items was calculated into the variable openness.

The cognitive appraisal questionnaire measuring threat versus challenges contained ten items; six measured threat, while the other four measured challenge. The statements were rated on a 6-point Likert scale (1= strongest disagreement; 6= strongest agreement). This questionnaire was previously validated. In this research, the Cronbach's alpha was 0.90 for the threat factor (items 1, 2, 3, 5, 7, 8), but only 0.60 for the challenge factor (items 4, 6, 9, 10). After deleting item number 4, the Cronbach's alpha increased to 0.70. We therefore decided not to use this item. Since the items were measured as quasi-interval variables, the means of all the items for each factor were calculated into the variables threat and challenge.

Student motivation for learning was assessed through the previously validated Academic Motivation scale (AMS). The AMS consists of 28 items with three sub-scales: intrinsic motivation (IMOT), extrinsic motivation (EMOT) and a motivation (AMOT). The statements were rated on a 7-point Likert scale (1= strongest disagreement; 7= strongest agreement), and Cronbach's alpha was high for all sub-scales: IMOT α=0.92, EMOT α=0.90, and AMOT α=0.91. Since the items were measured as quasi-interval variables, the means of all the items for each motivation were calculated into the variables IMOT, EMOT and AMOT.

Results

Prior to examining the models' assumptions, the statistical tests skewness and kurtosis were conducted in order to examine that the variables of the study is normal. The values of the indicators indicated that for all the variables the distribution was within the normal limits. The average of the dependent variable IL self-efficacy was 5.75 (SD = 0.77). In order to examine the relationship between the dependent variable (IL self-efficacy) and the independent variables (openness, threat, challenge, and academic motivations), researchers performed Pearson correlations.

The result shows significant correlations between the dependent variable IL self-efficacy and the independent variables openness to experience, threat, challenge, IMOT, and AMOT. There was a positive medium and significant relationship between openness to experience and IL self-efficacy (r = .45, p< .001). Hence, the more open to experience students are, the higher their IL self-efficacy. There was a negative, strong, and significant relationship between threat and IL self-efficacy (r = -.54, p< .001), meaning that the more students feel threatened, the lower their IL self-efficacy. There was a positive, strong, and significant relationship between challenge and IL self-efficacy (r = .57, p< .001); the more students feel challenged, the higher their IL self-efficacy. There was a positive, medium, and significant relationship between IMOT and IL self-efficacy (r = .33, p< .001). Thus, the higher students' intrinsic motivation is, the higher their IL self-efficacy. Finally, there was a negative, small and significant relationship between AMOT and IL self-efficacy (r = -.27, p< .01), showing that the more students are motivated to study, the lower their IL self-efficacy. There was no significant relationship between EMOT and IL self-efficacy (r = -.09, p> .05).

Researchers have also examined the relationship between the demographic variables and the IL self-efficacy. There was a positive, medium, and significant relationship between age and IL self-efficacy (r = .35, p< .001). Therefore, the older the students, the higher their IL self-efficacy.

Researchers have also investigated correlations between the independent variables: There was a negative, medium and significant relationship between threat and openness (r = -.35, p< .001), threat and challenge (r = -.48, p< .001) and a positive small relationship between threat and AMOT (r = .27, p< .001). There was a negative, medium and significant relationship between challenge and AMOT (r = -.34, p< .001), a positive medium significant relationship between challenge and IMOT (r = .43, p< .001) and a small relationship between challenge and openness (r = .28, p< .001). Finally, there were significant small correlations between IMOT, EMOT and IMOT: A negative relationship between AMOT and IMOT (r = -.26, p< .001) and positive relationships between IMOT and EMOT (r = .21, p< .05) and between AMOT and EMOT (r = .28, p< .001). There was no evidence of multi collinearity, as assessed by tolerance values greater than 0.1.

In order to examine whether there are differences between education levels and gender, a 2 X 2 ANOVA (education level X gender) was performed. The ANOVA revealed a significant difference between undergraduate students and graduate students ($F_{(1,135)}$ = 14.62, p< 0.001, η^2 =.10). It seems that the level of IL self-efficacy is higher among graduate students (M = 6.17, SD = 0.62) than among undergraduate students (M = 5.52, SD = 0.74).

No significant differences were found between males and females concerning IL self-efficacy (p> 0.05). However, a significant interaction between gender and education was found ($F_{(1,135)}$ = 4.39, p< 0.05, η^2 =.03). The result also shows the interaction between gender and education concerning IL self-efficacy, which demonstrates a bigger difference in the IL self-efficacy between undergraduate females (M = 5.47, SD = 0.78) and graduate females (M = 6.29, SD = 0.58), than between undergraduate males (M = 5.66, SD = 0.60) and graduate males (M = 5.90, SD = 0.63).

There were several variables that correlated with IL self-efficacy, and also correlated with one another, hence, researchers conducted a hierarchical regression analysis in which the dependent variable was IL self-efficacy. The hierarchical regression was conducted in order to be able to find mediators, as it was already done in a similar analysis situation. The regression explained 55% of IL self-efficacy. The predictors were entered as five steps: (1) personal details (age and education). These variables got priority since they are basic and provide primary information about the subjects; (2) personality characteristic openness to experience; (3) cognitive appraisal: threat and challenge; (4) intrinsic motivation, extrinsic motivation, motivation; and (5) interactions between the demographic variables and other research variables. In the regression analysis, the entrance of the first four steps was forced, while that of the interaction was entered according to their contribution to the explained variance. The result also presents the standardized and unstandardized coefficients of the hierarchical regression of IL self-efficacy.

The first step introduced in demographic variables, of which education variable contributed significantly by adding 19% to the explained variance of IL self-efficacy. The beta coefficient of the education variable was significant (β = .31, p< .001). This finding previously mentioned at the beginning of the results section, where the ANOVA revealed a significant difference between undergraduate students' IL self-efficacy, and those of graduate students, which was higher.

The second step introduced the openness variable that contributed significantly by adding 15% to the explained variance of IL self-efficacy. The beta coefficient of openness was significant and positive (β = .40, p< .001). Thus, the more students are open to experience, the higher their IL self-efficacy.

The third step introduced the cognitive appraisal variables (threat and challenge) that contributed significantly by adding 18% to the explained variance of IL self-efficacy. The beta coefficient of threat was significant and negative (β = -.24, p< .001), meaning that the more students felt threatened, the lower their IL self-efficacy. The beta coefficient of challenge was significant and positive (β = .31, p< .001), meaning that the more the students felt challenged, the higher their IL self-efficacy. This step caused a decrease in the β size of openness. A Sobel test indicated that both measures of cognitive appraisal mediated these variables: threat (z = 3.47, p< .001) and challenge (z = 2.99, p< .01) were each found to significantly mediate openness and IL self-efficacy. Hence, the more respondents are open to experience, and the more challenged and less threatened they are, the higher their IL self-efficacy.

The fourth step introduced the motivation variables of intrinsic motivation extrinsic motivation, and lack of motivation. These did not contribute significantly to the explained variance of IL self-efficacy. As the fifth step, researchers checked for interactions between the demographic variables and other research variables and added the interaction between education X openness, that was found as significant and added 2% to the explained variance of IL self-efficacy. The beta coefficient of education X openness was significant and negative (β = -.16, p< .001).

The result also shows that among undergraduate students, there was a much stronger relationship between openness and IL self-efficacy (β = .34, p < .001) than among graduate students (β = .03, p > .05). It seems that among undergraduate students, more than among MA students, the more they are open to experience, the higher their IL self-efficacy.

Discussion

Based on the premise of the openness to experience perspective, cognitive appraisal paradigm, and motivation concept, the present study examined the extent which these variables explain students' IL self-efficacy. By addressing these questions, this article makes several theoretical contributions by:

- expanding the literature concerning IL self-efficacy and revealing that students' IL self-efficacy is quite high (5.75 out of 7);
- Confirming that the personality characteristics of openness to experience, as well as threat, (1991) challenge, and motivation affect students' IL self-efficacy.

Addressing the study's hypotheses, five were confirmed and one was rejected.

$H_{(1)}$, that focused on openness to experience, was accepted and shows that an increase in students' openness to experience is expected to raise their IL self-efficacy. This finding is in line with previous literature that proposed that students who are more open to experience also have higher IL skills (Kwon and Song, 2011). In addition, further studies noted that people who are open to experience use various information sources, and analyze and evaluate them more thoroughly (Halder et al., 2010). Thus, we may conclude that higher levels of openness to experience, massive usage, analysis and evaluation of information, results in higher students' IL

self-efficacy. In other words, these students believe they know how to handle and evaluate information.

$H_{(2)}$ and $H_{(3)}$ focused on the cognitive appraisal threat and challenge were accepted and show that the more threatened students are when searching for information, the lower their IL self-efficacy. Conversely, the more challenged they are when searching for information, the higher their IL self-efficacy. These findings can be associated with Kuhlthau (2004) that suggested that individuals who presented a lack of confidence in their abilities (low self-efficacy) and who avoided challenging activities, were less inclined to develop IL competencies, while those who presented high self-efficacy were likely to develop these competencies.

Findings show that the situation of seeking information is a complex one that affects students' IL self-efficacy. This finding may help librarians, information professionals, and instructors when preparing their IL courses. They should be aware of students' feelings of threat and challenge, trying to reduce feelings of threat, while in the same time trying to increase the challenge feelings. They should bear in mind that high self-efficacy reduces anxiety, and increases students' efforts (Bandura 1986). They should explain the process of search thoroughly, assisting students and be available and supportive along the whole search process. Meanwhile, they should emphasize the challenge that accompanies the process of information searching. This interesting finding can be linked to a previous one (Putwain et al., 2015) that suggested that both challenge and threat influenced attainment value and academic self-efficacy.

$H_{(4)}$ was also supported and showed that the higher students' intrinsic motivation is, the higher their IL self-efficacy. This finding is not surprising and reflects various earlier researchers (Deci et al., 1991) that suggested that intrinsic motivation is associated with positive academic performance. Further, a thorough review of the literature showed that intrinsic motivation is especially important when considering IL skills (Kuhlthau, 2004). A similar finding was revealed in the current study as well; however, it was associated with IL self-efficacy and not with IL skills. Various scholars suggested that when students have intrinsic academic motivation, they will have high levels of self-determination and will have pleasure or satisfaction derived from the process of learning that, in our case, resulted in higher IL self-efficacy. Again, then, librarians, information professionals, and instructors should be aware of this finding, trying to increase students' intrinsic motivation while making IL courses more attractive, interesting, and challenging.

$H_{(5)}$, addressing the association between extrinsic motivation and IL self-efficacy was rejected. There was no relationship between extrinsic motivation and IL self-efficacy. Thus, librarians, information professionals, and instructors should be familiar with this result, understanding that extrinsic rewards will not affect students' IL self-efficacy. However, they should focus and encourage students' inner motivation concerning IL self-efficacy.

Results pertaining to $H_{(6)}$ were also accepted, indicating that the more students are motivated to study, the lower their IL self-efficacy. This finding may be related to the literature that suggested that students who are motivated feel a sense of futility in their actions, or that their activities are without value, and thus encourage students' passive behavior. It seems that in our study, this feeling of motivation affected students' IL self-efficacy. Therefore, librarians, information professionals, and instructors should be aware of the fact that there are motivated students among their audience. They should try to challenge them with interesting, motivating learning scenarios, causing them to be involved with and engaged in the course materials, and perhaps change their motivated attitudes towards learning.

An additional, interesting finding emerged from the results. IL self-efficacy scores are higher among graduate students than among undergraduates. This finding echoes Kurbanoglu's (2003) who found that IL self-efficacy was low during the first year of college. We may assume that graduate students who chose to continue their education are more experienced in the learning process, and therefore have higher IL self-efficacy scores than undergraduate students. Librarians, information professionals, and instructors should consider this finding when preparing their material, and concentrate more time and effort on undergraduate students who probably lack learning experience.

Conclusions

The current study highlights the associations between openness to experience, threat, challenge, motivation, and IL self-efficacy. The findings may have theoretical and practical implications. The theoretical aspect emphasizes the importance of personality and situational characteristics, as well as motivation, in the process of dealing with IL self-efficacy. The practical aspect of this study addresses librarians', information professionals', and instructors' awareness that although students are assumed to be digital natives, there is a range of skills among them. Some are stressed, and some are challenged when they have to handle vast amounts of information.

Recommendation

1. Those who work with students should try to increase students' intrinsic motivation, in order to improve their IL self-efficacy that may help them in the academy, as well as in other aspects of their life in the future.

2. In order to gain a broader perspective about IL self-efficacy, it is recommended that a future study include a larger number of students from other disciplines.

3. In order to gain an international perspective, the study should be carried out in other countries as well.

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