



## INVESTIGATION INTO INFORMATION LITERACY AND THE USE OF WEB 2.0 TECHNOLOGIES IN A FACULTY OF ARCHITECTURE

 **Derya Bakbak**

Hasan Kalyoncu University, Turkey.  
Email: [dbakbak27@gmail.com](mailto:dbakbak27@gmail.com)



### ABSTRACT

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Following a rapid development in technology, many information sources are now digitized. Consequently, individuals are expected to demonstrate the skills needed to critically evaluate, synthesize, and effectively use those sources. In this context, information literacy and information technology, especially skills with Web 2.0 tools, have become concepts that directly affect each other's development. This study investigated the information literacy self-efficacy and use of Web 2.0 tools among architectural students in particular. A t-test and ANOVA were performed on the data collected through a questionnaire survey. The results revealed that there was no difference in information literacy self-efficacy according to the participants' gender or duration of internet use but did vary with the level of their knowledge of foreign languages and Web 2.0 tools. In addition, instant messaging systems were the most preferred of the Web 2.0 tools to use for educational purposes. Ranked from most to least preferred, other Web 2.0 tools included Facebook–Twitter, video sharing platforms, blogs, wikis, and podcasts.

**Contribution/Originality:** This study contributes to the existing literature on social media and information literacy as follows: adds to the few studies of information literacy among architectural students; examines information literacy in the context of social media; and provides information on how students use social media for educational purposes.

## 1. INTRODUCTION

With the rapid development of information and communication technologies, the requirements and processes of a profession change, as is the case for the architectural profession; thus, an examination of the use of technology in architectural education is inevitable. In addition, technological advances have altered the concept of literacy: nowadays, with more complex information structures and sources, of the emphasis is on information literacy skills (Tuominen, 2007). In the 21st century, both information and technology literacy are now accepted as part of everyone's basic skills set (Eisenberg, 2008).

With the emergence of the information society, individuals were expected to be competent in information literacy, leading to studies on the integration of information literacy into higher education programs in many countries (e.g., the UK and USA) (Johnston and Webber, 2003; Wang, 2007). It is noteworthy that information literacy and social media tools are directly affect each other's development.

### 1.1. Information Literacy Self-Efficacy (ILSE)

Luo (2010) presented the information literacy definition: “a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information.” An individual who is information literate, therefore, must be able to not only understand they need but also find, evaluate, and use information (Association of College & Research Libraries [ACRL], 2006).

Bandura (1993) explained that self-efficacy was an individual's belief that they would become competent in whatever was required. Such self-belief affects their emotions and thoughts in respect of achieving their goals and rectifying events that affected their lives. According to Zimmerman (1995), self-efficacy is an individual's personal judgment of their own ability to perform a job and succeed. Information literacy self-efficacy (ILSE) can thus be defined as an individual's personal judgment of their own ability to access information, evaluate, and use information effectively.

The information literate person should exhibit the following skills: (1) decide on the nature and extent of the information needed; (2) access the required information effectively and efficiently; (3) critically evaluate information and its sources then incorporate the information selected into their knowledge base and value system; (4) use information effectively to accomplish a specific aim; and (5) understand many of the economic, legal, and social issues relating to the use of information, and access and use information ethically and legally (Johnston and Webber, 2003).

With regard to the requirements of the information society and information literacy, information literate individuals need to be able to face the challenges of their areas of work. Consequently, problem-solving and lifelong learning skills are required, based on both a strong sense of self-efficacy and basic knowledge of information literacy (Kurbanoglu, 2003).

In recent years, there has been an increased number of studies using the ILSE scale to measure the belief of individuals in their information literacy skills. These studies have focused on teachers, teacher candidates, and university students (Sheehy, 2001; Kurbanoglu and Akkoyunlu, 2002; Polat, 2005; Aharony and Gazit, 2018), while very few have involved architectural students.

### 1.2. Web 2.0

The concept of Web 2.0 was first introduced by O'Reilly with the 2004 Web 2.0 Conference where developments in the Web and its future were discussed. From that first day, Web 2.0 was explicitly mentioned by over 9.5 million citations on Google within one and a half years; however, considerable disagreement over its meaning remains, with some dismissing it as a meaningless marketing buzzword, while others consider it is a new conventional wisdom. At the conference, O'Reilly expressed the concept of Web 2.0 as a set of rules, of which the most prominent was the “web as a platform,” along with the ability to discover accumulated knowledge and determine rich user experiences (O'Reilly, 2007).

Researchers classify the variety of social media tools differently: Mayfield (2008) uses the categories of social networking sites, blogs, wikis, podcasts, forums, content communities, and microblogs; Kaplan and Haenlein (2010) uses collaborative projects, blogs and microblogs, content communities, social networking sites, virtual gaming worlds, and virtual communities

*Collaborative Projects:* Allowing many individuals to work together on the same project (e.g., research analysis, dictionary compiling, or group project), wikis are the best example of collaborative projects. All the participants can edit content, anytime, anywhere, and every action is recorded. In addition, students on a course can share and contribute ideas on their program's discussion forum.

*Blogs and microblogs:* Seen as the premise to social media sites, blogs and microblogs, as well as forums, are regarded as personal web pages through which individuals can communicate with one another using text and multimedia, such as videos, sound clips, and pictures. The blog or forum owner can post messages or upload

information, which their followers can download, and also post comments. The most well-known blogs are Wordpress.com, Blogger.com, and Yahoo!, while the most popular microblog is Twitter.

*Content communities:* By creating an account on a content Community, users can upload and share media content (e.g., videos, images, sound clips, and PowerPoint presentations). The easiest way to share media content is to send out either a direct link or a link to a personal blog that other users can click on to access. The most common types of content communities are YouTube (for videos), FlickrR (for photos), and SlideShare (for PowerPoint presentations).

*Social networking sites:* Such sites enable social communication by allowing users to create personal profiles, invite others to join their network, access other users' profiles, share information (e.g., text, images, videos, and links on other sites), and send e-mails. Site owners monitor access and online group discussions. The most popular social networking sites are Facebook, Ning, LinkedIn, and MySpace, of which Facebook can act as a forum for class discussions (Manca and Ranieri, 2016).

*Virtual gaming worlds:* Users can participate in virtual games via personalized avatars on these platforms, of which the best known are World of Warcraft and Minecraft.

*Virtual communities:* Users select personalized avatars and assume similar virtual behaviors, lives, and activities similar to their real ones; they can then meet one other at a particular place in the virtual world to do things together. A teacher can thus design a virtual classroom, or other venue, where students can meet for class discussions. Second Life, the most well-known, offers a number of teaching and learning applications. The only difference between their virtual and real lives is that users tend to behave in a less constrained manner in the former than they would in the latter. Second Life, the most well-known, offers a number of teaching and learning applications.

Consequently, social media is rapidly becoming integral to people's social life. Different perceptions of social media exist: some use it to escape socialization, a self-imposed isolation, and become more observer than participant; to others it is a way to socialize with, and be appreciated and followed by, the community. Nonetheless, social media plays an important role, especially in the lives of adolescents, who thereby form friendships, exchange messages—rather than talking on the phone—and keep their smartphones on, even overnight, to follow others through social media (Kirschner and Karpinski, 2010). Several studies have been conducted on students' use of social media in recent years. Back in 2010, Vural and Bat reported that 82% of university students and 55% under 19 years of age used social networking sites, while 28% aged 13–19 had a blog. Moreover, based on the online content, such as photos, news stories, or blogs posts, supplied by 28% of users, 48% use video sharing sites, such as YouTube (Vural and Bat, 2010).

It has been estimated that users spend 3 hours per day on such social media activities, out of an average of 4 hours per day using the internet (Tufan, 2016); Wang *et al.* (2011) had already claimed that many students were spending countless hours on social media, such as Facebook or SimCity, every day. At first, this may appear a waste of time, but these activities help students acquire important knowledge and develop essential social skills, and thus become creative and sharing citizens. Nowadays, most students use social media on a daily basis, whether or not they are for or against social media, and the positive aspect is that young people can seek academic help and support from online communities. In fact, Wang *et al.* (2011) reported the positive effect of social media on university students: not only making friends from diverse backgrounds but also providing a means of reducing pressure.

Furthermore, students do tend to take a positive attitude toward social media (Vidal *et al.*, 2011), generally due to their use of those sites (Alican and Saban, 2013; Aküzüm and Saracoğlu, 2017); Students' gender (Aküzüm and Saracoğlu, 2017) and social class was of no significance (Bedir, 2016). In addition, social media's perceived ease of use affects students' perceptions of its benefits and their intention to use it (Armagan *et al.*, 2017); according to Efe (2017), students' positive attitudes toward social media strengthens as their use increases. Students spend time both consulting and contributing to social media sites on a daily basis (Avcı *et al.*, 2015; Kural *et al.*, 2016), even

disrupting their daily routines (Ergenç, 2011). Excessive use of social media, however, can affect students' academic success (Wang *et al.*, 2011; Bedir, 2016). Students should be able to use social media in an academic context (Vidal *et al.*, 2011; Avcı *et al.*, 2015) and access information about activities at their institution (Dikme, 2013). The students use social media to spare time activity (Ok, 2013).

Studies (Demiralay, 2008; Godwin, 2009; Luo, 2010; Sorgo *et al.*, 2017) have been conducted on the integration of information literacy and Web 2.0, suggesting, especially in those in the field of librarianship, that Web 2.0 tools could help develop ILSE. According to Godwin (2009) the key factor will be the relationship between and partnership with academic staff, learning and teaching, or curriculum, planners, and IT trainers. The reasoning behind this integration is that information literacy provides the required skills while the Web 2.0 tools provide the necessary resources and means of interaction to enable people to learning in collaboration.

### 1.3. Architecture and Technology

The first formal education for architecture originated in the 19th century with the École and Académie des Beaux-Arts, but its curriculum has since been challenged. However, changes to the architectural syllabus is unusual, the most significant being that introduced by W. Gropius at the Bauhaus, and then expanded at Harvard. One style of the Bauhaus model creates the effect of reviving a design rather than the spread of dogma (Gül *et al.*, 2013; Salama, 2016). Another change is now called for, and one proposal is for seven years of academic study, comprising a four-year undergraduate course to achieve a professional degree followed by a three-year training program. However, three years of intensive architectural study is not considered sufficient to acquire the necessary experience and develop an adequately varied portfolio to meet the requirements of the profession. Architectural courses can be grouped under the technology umbrella, but they are not currently considered to be comprehensive (Lökçe, 2002; Salama, 2016). Architectural education aims to instill the abilities of organization, research, expression, openness to criticism, and recognition of positive results from discussions. Architectural student should therefore be educated in being open-minded, adopting new technological advances, and, based on their professional knowledge, being creative; the concept of design should be underpinned by social science and a substantial theoretical infrastructures (Nalçakan and Polatoğlu, 2008). Information literacy contributes to achieving all these goals. Information literacy and information technology are related but different: critical thinking is at the core of information literacy, to develop a hypothesis, formulate questions, explore general information sources (Iannuzzi, 2000); learning how to use applications such as email or courseware, is the objective of computer and technology literacy, a prerequisite for information literacy. Thus, a positive correlation exists between computer and information literacies self-efficacy (Akkoyunlu and Kurbanoglu, 2003).

As for all university students, information literacy is an important skill for those studying architecture, and ILSE is associated with the effective use of Web 2.0 tools. In this context, the following research questions will be addressed:

What is the students':

- a) Information literacy level.
- b) Web 2.0 skills level.
- c) Frequency of using Web 2.0 tools.
- d) Frequency of using Web 2.0 tools for educational purposes?

Is the students' information literacy level influenced by:

- a) Gender.
- b) Foreign language level.
- c) Time spent using the internet.
- d) Web 2.0 skill level?

## 2. METHODOLOGY

### 2.1. Research Methods

The research method adopted fell within the scope of a survey study: the current status of architectural students was examined and no intervention was applied to adjust that status.

### 2.2. Sampling

Students from the architectural department of a private university in Turkey's Southeastern Anatolia Region were surveyed. Of the participants: 52% were female and 48% male; their foreign language level ranged through 18.2% weak, 48.5% moderate, 22.2% good, and 11.1% very good; and 94% could access the internet from home.

### 2.3. Data Collection Tool

Data was collected by means of the questionnaire developed by [Ata \(2011\)](#), consisting of three sections: Section I comprises demographic questions; Section II includes questions about Web 2.0 tools; and Section III contains the 28-item, Likert-type ILSE scale (from 1 = almost never true to 7 = almost always true). Cronbach's alpha was calculated as 0.929, compared with a value of 0.96 in [Ata's study \(2011\)](#). The ILSE mean scores were classified as follows: 5–7 as high, 3–4.99 as moderate, and 2.99 and below as low ([Ata, 2011](#)).

### 2.4. Data Analyses

Each item on the scale was examined, and those with missing values eliminated, to calculate the ILSE score for each participant. Skewness and kurtosis tests were then performed to determine whether the data had a normal distribution.

**Table-1. Skewness and kurtosis related to ILSE.**

N	Skewness		Kurtosis	
	Statistic	Std. error	Statistic	Std. error
100	-0.461	0.241	0.116	0.478

As the values shown in [Table 1](#) range from  $-1$  to  $+1$ , a normal distribution can be assumed ([Hopkins and Weeks, 1990](#)). An F-test, independent sample t-test, and one-way analysis of variance (ANOVA) were also performed. SPSS V24 was used for the statistical analysis, with 0.05 accepted as the level of significance.

## 3. FINDINGS

**Table-2. Descriptive statistics.**

Variable	N	Min.	Max.	$\bar{x}$	SD
Information literacy self-efficacy (ILSE)	100	2.14	6.93	5.04	0.97

Taking the average of the ILSE scale for all participants, it can be seen from [Table 2](#) that the mean is high. It was found that 3% of the participants were classified at a low level, 42% moderate, and 55% high.

**Table-3. Mean and t-value of ILSE according to gender.**

Gender	N	$\bar{x}$	Std. deviation	t-test	p
Female	52	5.18	1.02	1.422	0.158
Male	48	4.90	0.90		

According to the t-test result ( $t = 1.422, p = 0.154$  [ $> 0.05$ ]) shown in Table 3, the participants' ILSE does not change according to their gender—it is similar for male and female students—but this result is not statistically significant.

Table-4. Mean of ILSE according to proficiency in foreign language.

Level	N	$\bar{x}$	SD	Mean square	F <sub>(3,98)</sub>	p	$\eta^2$	LCD
Weak	18	4.34	0.99	4.266	5.101	0.003*	0.019	Moderate > Low
Moderate	48	5.33	0.84					Good > Low
Good	22	5.07	0.99					
Very good	11	4.96	0.94					
Total	99	5.05	0.97					

Table 4 shows that according to their foreign language level, the participants' ILSE is highest in the moderate group and lowest in the weak; thus, there is no linear change in ILSE with foreign language level.

The ANOVA determined the differentiation between the groups and found it to be statistically significant, with a small effect size [ $F_{(3,98)} = 5.101, p = 0.003 (< 0.05), \eta^2 = 0.019$ ]: the participants' knowledge of foreign languages affects their ILSE scores. According to the post hoc test, this differentiation is between the weak level and both the good and moderate levels.

Table-5. ANOVA results for participants' ILSE by duration of internet use.

Internet use	N	$\bar{x}$	SD	Mean square	F <sub>(3,99)</sub>	p
1–7 hours per week	10	4.93	0.84	0.867	0.923	0.433
8–21 hours per week	33	4.84	1.10			
22–35 hours per week	18	5.21	1.00			
> 36 hours per week	39	5.17	0.86			
Total	100	5.04	0.97			

The ANOVA results in Table 5 show the significance of the differentiation between the hours spent each week by participants using the internet according to their ILSE scores. The mean of those who spent 22–35 hours per week is the highest while those spending 8–21 hours the lowest, but their skill level had no significant effect [ $F_{(3,99)} = 0.923, p = 0.433 (> 0.05)$ ]: participants' ILSE scores were similar in terms of the number of hours they spent on the internet.

When compared, the participants' ILSE scores were lower for each Web 2.0 tool than the skill level shown in using blogs, wikis, video sharing platforms, and instant messaging systems, but higher than the moderate skill levels with Facebook–Twitter and podcasts. Therefore, an ANOVA was performed to determine the significance of this differentiation.

The results in Table 6 show there was no significant effect of ILSE on the skill level with: blogs [ $F_{(2,95)} = 1.769, p = 0.176 (> 0.05)$ ], wikis [ $F_{(2,93)} = 0.555, p = 0.576 (> 0.05)$ ] and video sharing platforms [ $F_{(2,88)} = 0.206, p = 0.814 (> 0.05)$ ]. However, there was a significant effect for: podcasts [ $F_{(2,93)} = 6.289, p = 0.003 (< 0.05)$ ], with Tukey's test revealing a differentiation is between basic skills level and other levels; instant messaging systems [ $F_{(2,94)} = 5.552, p = 0.005 (< 0.05)$ ], with a differentiation again between basic skills levels and other levels, according to Tukey's test; and Facebook–Twitter, [ $F_{(2,91)} = 3.808, p = 0.026 (< 0.05)$ ], with Tukey's test showing a differentiation between basic and advanced skill levels.

Table-6. ANOVA results for participants' ILSE by duration of internet use and skill level on Web 2.0 tools.

Social Media Apps	Skill Level	N	$\bar{x}$	SD	Mean Square	F	p	$\eta^2$	Tukey
Blog	Basic	37	4.80	1.14	1.625	1.769	0.176		
	Moderate	48	5.16	0.82					
	Advanced	11	5.26	1.00					
	Total	96	5.03	0.98					
Wiki	Basic	25	4.93	0.91	0.489	0.555	0.576		
	Moderate	48	5.04	0.97					
	Advanced	21	5.22	0.88					
	Total	94	5.05	0.93					
Podcast	Basic	23	4.44	1.13	5.452	6.289	0.003	0.121	Moderate > Basic
	Moderate	41	5.29	0.80					Advanced > Basic
	Advanced	30	5.08	0.93					
	Total	94	5.01	0.98					
Video sharing platform	Basic	8	4.88	1.24	0.199	0.206	0.814		
	Moderate	40	4.99	1.02					
	Advanced	41	5.09	0.89					
	Total	89	5.03	0.97					
Instant messaging system	Basic	9	4.16	1.04	4.848	5.552	0.005	0.108	Moderate > Basic
	Moderate	31	4.90	0.80					Advanced > Basic
	Advanced	55	5.24	0.99					
	Total	95	5.03	0.98					
Facebook-Twitter	Basic	19	4.60	0.93	3.190	3.808	0.026	0.079	Advanced > Basic
	Moderate	31	5.00	0.85					
	Advanced	42	5.29	0.95					
	Total	92	5.05	0.94					

Table-7. Skill level and frequency of use for Web 2.0 tools.

Social Media Apps	Skill Level			Frequency of Use				
	Basic	Moderate	Advanced	Never	Rarely	Sometimes	Frequently	Always
Blog	37	48	11	27	26	29	13	4
Wiki	25	48	21	8	12	40	27	9
Podcast	23	41	30	11	8	31	39	9
Video sharing platform	8	40	41	4	9	19	31	26
Instant messaging system	9	31	55	5	7	14	34	40
Facebook-Twitter	19	31	42	14	15	23	24	24

As can be seen in Table 7, the majority of the participants possessed moderate and high levels of skill with the Web 2.0 tools, of which the most used (i.e., frequently and always) was instant messaging systems (74), followed by video sharing platforms (57) and then Facebook-Twitter and podcasts (48 each).

Table-8. Using Web 2.0 tools for educational purposes.

Educational activities	Blog	Wiki	Podcast	Video sharing platform	Instant messaging system	Facebook-Twitter	Total
Communicating with classmates (student-student)	12	3	7	16	48	26	112
Communicating with teacher (student-teacher)	4	7	6	6	30	14	67
Accessing course materials/receiving relevant announcements	15	16	12	17	36	29	125
Conducting class discussions	6	4	10	9	39	23	91
Transmitting course materials and resources	4	5	4	9	43	36	101
Posting announcements about school, class, or courses	9	6	13	9	44	34	115
Assignments or assignments related to the course	10	5	6	6	41	35	103
Establishing academic groups (communities) according to common interests and needs	7	6	7	10	39	32	101
Sharing information about courses or other educational studies	10	11	7	15	45	36	124
Creating/joining a group	12	3	2	9	50	32	108
Accessing extensive learning resources and materials	18	25	11	19	33	30	136

Furthermore, the frequency of use with which participants use Web 2.0 tools affects their preference of which to use for educational purposes, as is evident in Table 8. Thus, instant messaging systems being the most used, they were the most preferred for educational purposes (448), followed once more by Facebook-Twitter (327) and video sharing platforms (125), with blogs (107), wikis (91), and podcasts (85) being the least preferred. In terms of the educational activities for which Web 2.0 tools are used, they are most preferred for “accessing extensive learning resources and materials” (136). A high preference is also demonstrated for “accessing course materials/receiving relevant announcements” (125), “sharing information about courses or other educational studies” (124), “posting announcements about school, class, or courses” (115), and “communicating with classmates (student-student)” (112); however, “communicating with teacher (student-teacher) is the least preferred (67).

#### 4. RESULTS AND DISCUSSION

ILSE is an essential skill for not only academic success (Ross *et al.*, 2016) but also for functioning more effectively in the information society (Greenhow and Lewin, 2016), in which students must be able to cope with and adapt to the various information systems available (Odede, 2018). This study discovered that on average participants' ILSE was high, with the majority (97%) being at a moderate or high level. This is encouraging, because today's students have to evaluate very different learning resources and synthesize the information extracted.

The ILSE levels of participants in this study was unaffected by gender, confirming the results of previous studies (Usluel, 2007; Ata, 2011). However, there are other studies (Demiralay, 2008; Baro and Fyneman, 2009; Henkel *et al.*, 2018) that have found variation in ILSE levels according to gender.

The knowledge of foreign languages among participants in this study affected their ILSE levels, as other studies (Demiralay, 2008; Ata, 2011) also discovered. It may be, therefore, that learning foreign languages may offer the opportunity to access more information resources, particularly since the majority of internet tools and resources require a knowledge of English. In contrast to those earlier studies (Demiralay, 2008; Ata, 2011), though, this study found no change in participants' ILSE levels according to the duration of their internet use.

As social media becomes more dominant in students' daily lives, librarians and faculty staff can provide opportunities for developing information literacy skills within the online environments in which students regularly participate (Miller, 2012). For instance, the majority of participants in this study possessed a basic or moderate level of skill with blogs, wikis, and podcasts and a moderate or advanced level with video sharing platforms, instant messaging systems, and Facebook–Twitter.

Whereas this study found no significant differentiation in the levels of skill with blogs, wikis, and video sharing platforms, the differentiation was significant for podcasts, instant messaging systems, and Facebook–Twitter, where basic ILSE skills was the lowest. Those who have a greater knowledge of Web 2.0 tools believe they are more competent in information literacy, and participants ILSE levels in a study by Ata (2011) did vary according to their use of Web 2.0 tools.

There are two aspects of Web 2.0 tools related to information literacy: first, librarians, academic staff, and academic publishers who are responsible for the effective dissemination of information sources use these tools; and second, students and academics who evaluate and exploit information resources in their studies and research also use them. In fact, both groups are supporting and developing each other's skills.

This study investigated the second aspect and found that the level of skill with Web 2.0 tools, such as instant messaging systems, affected ILSE levels. In addition, the Web 2.0 tools preferred for educational activities could be inferred and subsequently used effectively, within the context of mutual interaction, by information resource providers and academic tutors to support information dissemination and its integration into the learning process, respectively.

In fact, information literacy is gradually evolving with the use of digital resources and, with the increasing importance of Research 2.0 (Koltay *et al.*, 2015), Web 2.0 tools will play an effective role in the information literacy process. In terms of architectural education, there are Web 2.0 applications that can provide a 24-hour collaborative learning environment for students (Tate and Osborne, 2013).

When the Web 2.0 used tools for educational purposes were ranked according to the number of students who used them frequently or always, the most preferred across all activities was instant messaging systems, followed by Facebook–Twitter and video sharing platforms; blogs, wikis, and podcasts were the least preferred for educational purposes.

This examination also revealed the educational activities for which Web 2.0 tools were preferred was to directly access internet resources. In terms of interaction, there was a moderate level of preference for communicating with classmates, while that with teachers was the least preferred. Students' preferences should be taken into account in architectural education: tutors should enhance their course materials and emphasize the use of technology, such as Web 2.0 tools, to accomplish tasks (Eisenberg, 2008).

There are several limitations to this study, however. First, the data is based on students' self-report alone, actual information searching was not observed or recorded. Second, to obtain a broader perspective of ILSE, further studies should include a larger number of students from other disciplines; likewise, an international perspective can be gained through the study should by conducting studies in other countries. Finally, such studies should also use qualitative methods, such as interviews and open-ended questions, to add to the quantitative analysis undertaken in this study.

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