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Abstract

An effective and inclusive exchange of knowledge is an essential part of a successful and practice-oriented in higher educational institutions. This study examines the factors influencing knowledge sharing among Students of Jamshoro education city higher educational institutions of Sindh province in Pakistan. The study was cross sectional and quantitative in nature. The survey was conducted among Students of 3 public sector higher educational institutions in Jamshoro education city. The convenience sampling technique was used to collect data through questionnaire. The questionnaires consisting of two main parts were used to collect the data. The first part collected demographic data and the second section included questions about social networking factors. Questionnaire distributed and Google form was used for data collection which was emailed to 600 respondents, 470 were respondents and filled the questionnaire, and 450 were evaluable and useful for data analysis. Questionnaire was developed from literature. Smart-PLS 4.0 version was used for measurement model and structural model. Results show that Data sharing, information technology, apparent enjoyment, shared benefit, and Information technology positively influenced knowledge sharing among the students. However, the availability of technology did not affect knowledge sharing among Students. Findings suggest that universities should encourage students to share their knowledge by designing courses notes and exams that integrate data sharing and information technology to promote enjoyment and awareness of the mutual benefits of knowledge sharing.

Keywords: Knowledge Sharing, Social networks, HEIs, Students, Technology

1. Introduction

Since most technical work is done by teams of individuals who are geographically dispersed and communicate virtually, Knowledge Sharing is crucial. As the next generation of leaders, students must behave positively towards knowledge sharing in order to enhance their career prospects in the global economy and position them for success in the information society (Chong, Teh, & Tan, 2014). The idea of a social network for knowledge sharing is becoming more widely accepted and has received increased attention lately. A distinct kind of learning known as interactive style is gaining popularity since social media is a crucial component of education (Jameel, 2018). Social media advancements today extend beyond individual use. Companies are starting to see them as instruments for sharing information (Lam, Yeung, & Cheng, 2016; Thabit & Raewf, 2015). Students have also disseminated knowledge via social media (Eid & Al-Jabri, 2016; Wang, Woo, Quek, Yang & Liu, 2012). According to Mousa et al. (2019), students typically communicate their knowledge in two ways: formally through academic systems like Moodle and informally through social media (Chong et al., 2014). Online sharing data tools and organizational document management systems have demonstrated a strong association with various forms of trust (Ozlati & Donaldson, 2012). Technology is essential for promoting knowledge sharing since it facilitates student collaboration and communication. By using a machine-based theory and research strategy, information technology has significantly improved educational methodology (Jantavongso & Nuansomsri, 2018). Such strategies provide students with opportunities to acquire future knowledge and perspective (Jameel, Mahmood, & Jwmaa, 2020). In recent years, the exponential growth of information technology has helped improve learning and computer science opportunities in education. Information technology and computers have enabled students to share their knowledge regardless of regional restore Information Technology and have reduced travel and study time compared to the pre-computer age (Mousa, Jameel, & Ahmad, 2019). The availability of technology has enabled people to create, share, and communicate whatever they want with others around the world. Thus, a lack of technology would lead to problems in the workplace and especially in higher education institutions. At the same time, the teaching methods of are evolving with major advances in technology. As a result, the focus has been more on self-study than formal education (Koranteng, Wiafe & Kuada, 2019). A limited amount of research has been done in the Middle East (Eid and Al-Jabri, 2016), specifically in the Iraqi context. The majority of previous studies on knowledge sharing among university students have been conducted in Southeast Asian countries, including Malaysia (Chong et al., 2014), Indonesia (Rahab et al., 2013), and Thailand (Wangpipatwong, 2009). A number of issues plague the Iraqi educational system, including insufficient funding, low university standing, and a dearth of publications (Jameel and Ahmad, 2020). The purpose of the study is study examines the impact of social networking tools on knowledge sharing among students of Jamshoro education city higher educational institutions in Sindh province of Pakistan.

2. Literature Review

Knowledge sharing is the exchange of concepts and recommendations among individuals. According to Mousa et al. (2019), knowledge sharing occurs when people persistently dispute information or knowledge until it is accepted by others (David and Whittam, 2017). Knowledge sharing is a goal-oriented behaviour that is impacted by people's attitudes, social behaviors, and

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sense of authority. Through online student interaction, informatics and communications improve learning's (Brewer & Brewer, 2010). The computer science process now occurs, for instance, between individuals, groups, or organisations both within and across organizational boundaries (Aljuwaiber, 2016). Knowledge sharing is the sharing of experiences amongst individuals in the organisation that improves the relationship between the company's departments (Lo & Tian). One of the most important knowledge management procedures is knowledge sharing. Knowledge sharing is important because, while most people agree that effective knowledge management is a prerequisite for knowledge sharing, others think that knowledge sharing itself is a critical component of knowledge management.

People will perform better overall if they share their varied experiences and expertise, which is one of expertise Sharing's advantages. The quality of work, decision-making, problem-solving, and skill learning all improve when knowledge is shared among organizational members (Yang, 2007). According to Muse et al. (2019), the way people view their relationships with one another influences how well computer science activities are implemented, which in turn affects organizational effectiveness. People are driven to impart their knowledge to others because it is morally correct to do so. In order to positively impact community advancement, people feel obligated by ethics to share their expertise (Rahab & Wahyuni, 2013). Thanks to social networks' ease of use and quick connections when compared to email or the university system, students use them extensively these days for communication, discussion, and content sharing. Students' preference for using social media platforms to lend a hand to others and share their knowledge is another factor. Although social networks are available on many platforms, this study concentrates on those that students frequently use, like Facebook, WhatsApp, Viber, and Telegram (Eid and Al-Jabri (2016). The majority of student uses social media to research themes and ideas, work together on assignments and term papers, and exchange knowledge and information. Furthermore, as a learning system, students utilize Facebook groups to plan and finish their assignments (Hudin, Hudin, and Abdul Aziz, 2020). 90% of students report using Facebook to communicate with others about their education, instructors, or classes, and they think the social network is growing in popularity among students (Chu and Meulemans, 2008). Students' propensity to use Facebook groups to share their knowledge was described. Then, using a subjective norm, they rated their attitudes and sentiments of self-influence towards sharing knowledge (Pi et al., 2013). In order to determine how social media affects knowledge sharing, numerous studies have also been carried out (Eid & Al-Jabri, 2016).

One of the primary Internet innovations that students have embraced most widely is data sharing. Images, Word, Excel, PowerPoint, and educational videos are frequently shared by students. Simultaneously, the low cost of storage and the beneficial network externalities are significant factors contributing to the quick rise in student data sharing. Sharing Data is regarded as a subset of social networking sites associated with sharing knowledge (Eid and Al-Jabri, 2016). On the other hand, they described data sharing as the act of keeping data in files and disseminating it to students via one or more social networks (Daft and Lengel, 1986). Addressing information demands would enhance the calibre of student interactions. Iraqi students frequently share course materials, assignments, and lecture notes using social media platforms including Facebook, Viber, WhatsApp, and Telegram groups at Cihan University, all of which are made possible by the university's new Moodle system. Even so, there was still a low level of student participation, despite the fact that data sharing is clearly crucial for students in this kind of learning environment. Nonetheless, only a small body of research has looked at how data sharing affects KS in college students (Eid & Al-Jabri, 2016). Pleasure is correlated with netizens' use of social networks because pleasure influences how people decide whether or not to utilise social networks (Hsu & Lin, 2008). Playing solo or group games, as well as storing and sharing images and videos in files on one or more social networking sites, can all be considered forms of pleasure (Eid and Al-Jabri, 2016). However, there are two ways to find pleasure: by assisting others and by hanging out with pals on social media (Moghavvemi et al., 2017). Perceived satisfaction in assisting others via the transfer of information is a defining characteristic of joy in helping others (Kankanhall, Tan, & Wei, 2005). Social media activity surely piques the interest of internet users because participation boosts enjoyment (Pastor, 2012). That social media entertainment platforms offer an optimal chance for acquiring social skills and advocates for increased attention to entertainment in education. The game-based learning considerably enhances student learning by motivating students and increasing their engagement and interaction (Jameel, 2018). In higher education institutions, pleasure plays a significant role in knowledge sharing and has a favorable effect on knowledge sharing. Knowledge sharing benefits when he assists others in influencing him through internet blogging and enjoyment (Rahab & Wahyuni, 2013).

Technology is any tangible equipment, including hardware and software, which is employed in an organisation to carry out activities. According to Wangpipatwong (2009), technology plays a crucial role in communication since it enables peer-to-peer cooperation over an extended period of time. One of the components of technical aspects in the educational context is technological accessibility (Wangpipatwong, 2009). Information technology is seen as a significant component of technology drivers. Information technology has the potential to enhance and fortify computer science. Information technology facilitates knowledge exchange and increases peer-to-peer knowledge sharing efficiency and ease (Jameel & Ahmad, 2018). Reducing physical barriers between knowledge users and expanding access to knowledge information are two ways to attain knowledge sharing (Jameel and Ahmad, 2020a). Sharing knowledge has been made possible over time and distance by contemporary communication methods (Mousa et al., 2019). To encourage, facilitate, and maintain computer science, a mindset towards embracing new technologies is necessary (Han & Anantmula, 2007). Because of this, Kim and Jarvenpaa (2008) emphasized how crucial technology is to knowledge sharing within the company. Students may now communicate knowledge and information across time and space because of the rapid advancements in long-distance network technology, which helps them learn successfully through explanation and language (Soller, 2004). Information technology plays a significant role in increasing computer science, and its adoption helps academic institutions save time and money. Information technology had a

beneficial effect on knowledge sharing, according to an Iraqi study (Mousa et al., 2019). Kanaan and Gharibeh (2013) and Han and Anantatmul (2007) both claim that information technology and technology have an impact on knowledge sharing. The availability of technology that will aid in the promotion and support of knowledge sharing is the primary prerequisite of knowledge sharing among students (Ghran, Jameel, and Ahmad (2019). Iraqi students struggle with a lack of technology, IT management, and systems integration. But as technology enhances communication and pushes students to work remotely, it's essential for promoting computer science. A prior study found that having access to technology improved knowledge sharing in students attending Malaysian public and private universities; nevertheless, found inconsistent results (Chong et al., 2014). People obtain outside information instantly through reciprocity and use it as inspiration for new ideas. In addition, a person's intention to reap future benefits from their current acts is known as mutual benefit. When people feel that others should do the same favors for them, they should react (Aslam, Shahzad, Syed, & Ramish, 2013). Additionally, students devote time to answering questions and inspiring others to impart their knowledge, with the expectation that other students would gain from this and contribute their own ideas and solutions (Moghavvemi et al., 2017).

The extent to which a person thinks they can gain from information exchange is one example of expected reciprocal benefits. Research, individuals who perceive that their knowledge sharing benefits their peers through knowledge sharing are more inclined to see information sharing favorably and share more knowledge (Hsu & Lin, 2008). People should believe that their knowledge contribution is worthwhile, and those who anticipate positive feedback are more inclined to share their ideas and anticipate feedback from others (Moghavvemi et al., 2017). That people are more likely to share their creative ideas with others if they anticipate receiving the same in return for their knowledge. Found that students from Indonesian public and private universities produced results that were comparable to this (Chuang, Chen, and Tsai, 2015). Attitudes towards sharing knowledge are positively impacted by reciprocity. On the other hand, reciprocity little affected knowledge sharing in college students (Koranteng et al., 2019).

2.1. Hypothesis

- H1: Sharing Data has a positive impact on knowledge sharing among Students.
- H2: Information Technology has a positive impact on knowledge sharing among Students.
- H3: Technology Infrastructure Availability has a positive impact on knowledge sharing among Students.
- H4: Shared benefit has a positive impact on knowledge sharing among Students.

3. Research Methodology

The study was cross sectional and quantitative in nature to examine the impact of social media technology on knowledge sharing among the students of Jamshoro education city, higher educational institutions of Sindh. Structured questionnaire was used for data collection from the students. Questionnaire of this study was developed from the previous available literature. The knowledge sharing was measured by the Moghavvemi et al. (2017) has the six items, data sharing was adapted from Wang et al. (2012), Wangpipatwong (2009) with seven items, information technology adapted from the Kanaan & Gharibeh (2013) with five items, Technology Infrastructure was adapted from the Chong et al. (2014), Wangpipatwong (2009) with six items, shared benefits was adapted from the Moghavvemi et al. (2017), Phung et al. (2018) with six item. The questionnaire was developed on five liker scale with the range of 1 strongly disagree to 5 strongly agree. The respondents of the study were the students of Jamshoro education city. The convenience sampling technique was used to collect data through questionnaire. The questionnaires consisting of two main parts were used to collect the data. The first part collected demographic data and the second section included questions about social networking factors. Questionnaire distributed and Google form was used for data collection which was emailed to 600 respondents, 470 were respondents and filled the questionnaire, and 450 were evaluable and useful for data analysis. The data analysis of the questionnaire was done through Smart-PLS 4.0 version base on measurement model and structural model. To get the accurate estimation of standard error of the data, and bootstrapping sample was used with the sample size of 5000 bootstrapping (Arifin & Yusoff, 2016).

4. Data Analysis and Results

Table 1 provides a clear image of the distribution of respondents across several demographic categories by providing a succinct and well-organized representation of the quantitative demographic profile of respondents. By demographic profile, there is a clear breakdown of the respondents' distribution across academic disciplines, academic levels, technology familiarity, and preferred technologies for learning. It offers a quantitative understanding of the characteristics of the research participants, facilitating an analysis of how these characteristics impact their involvement in Jamshoro education city.

Approximately 72% of the respondents in the current study are male students, making up the majority of the respondents. However, just 28% of the participants are female. Sixty one percent of the respondents are between the ages of twenty and thirty, and twenty-eight percent are between the ages of thirty one and forty. The remaining responders, however, are in the over-41 age range. When questioned about the course they teach, the replies were similarly surveyed, and it was discovered that the majority of them—29% and 21%, respectively—were involved in engineering technology and medical science faculty. In contrast, 09% studding in natural science, 20% in social science, 12% in business and commerce, and 9% in other fields. Just 31% of the respondents were active in postgraduate teaching, while the majorities of respondents—69%—were involved in undergraduate education. When questioned about their past understanding of technology, the respondents were also asked, and the results show that 31% of them had basic level knowledge, while 43% had intermediate level knowledge, while 26% had only advance level knowledge and experience with technologies.

Table 1: Demographic Result

Demographic			Per%
		Gender	
	Male		72%
	Female		28%
		Age	
	20 years to 30 years		61%
	31 years to 40 years		28%
	41 and above years		11%
		Faculty	
	Engineering and Technology		29%
	Medical Science		21%
	Natural Science		9%
	Social Science		20%
	Business and Commerce		12%
	Any Other		9%
		Academic Level	
	Undergraduate		69%
	Post Graduate/ Master/PhD		31%
		Previous Knowledge of Technologies	
	Basic Level Knowledge		31%
	Intermediate Level Knowledge		43%
	Advance Level Knowledge		26%

Table 2: Outer loading

Variable	Items	Loading	CR	AVE	Cronbach's Alpha
Data Sharing	DS1	0.792			
	DS2	0.771			
	DS3	0.779			
	DS4	0.793	0.934	0.881	0.962
	DS5	0.822			
	DS6	0.801			
	DS7	0.750			
Information Technology	IT1	0.819			
	IT2	0.868			
	IT3	0.817	0.948	0.779	0.925
	IT4	0.849			
	IT5	0.804			
Technology Infrastructure	TI1	0.819			
	TI2	0.819			
	TI3	0.819	0.921	0.687	0.881
	TI4	0.799			
	TI5	0.832			
Shared Benefits	SB1	0.737			
	SB2	0.791			
	SB3	0.819	0.918	0.678	0.883
	SB4	0.849			
	SB5	0.799			
	SB6	0.801			
Knowledge Sharing	KS1	0.712			
	KS1	0.717			
	KS3	0.770			
	KS4	0.804			
	KS5	0.810			
	KS6	0.805	9.42	0.885	0.945
	KS7	0.739			
	KS8	0.757			

4.1. Measurement Model

PLS SEM was employed in this study to analyze the research further. PLS SEM analysis is classified as both a measurement model and a structural model. The measurement model is the first step in the PLS analysis process, and it is used to evaluate

the validity and reliability of the constructs. **Table 2** displays the factor loading for this study. **Table 2's** results make it clear that the items maintained in the study have outer loadings more than 0.50 (Hair Jr et al., 2014). In the measurement model step includes validity and reliability testing of variables and convergent validity and discriminant validity were performed.

4.2. Convergent Validity

In the measurement model minimum factor loading factors values should be >0.70, composite reliability should be >0.070, the extracted mean variance (AVE) > 0.50 to get convergent validity in this research minimum AVE is 0.678 and maximum is 0.885, Cronbach's Alpha > 0.70 is required for minimum values for internal consistency, and the reliability of all items which have the all values are greater than (Chin, 2010), (Hair et al., 2014).

4.3. Discriminant validity

To ascertain whether a construct discriminates against other constructs in the same model, discriminant validity is crucial. The Fornel-Larcker criterion, which finds a latent variable that explains its index better than the other latent variables, is the first method to verify discriminant validity (Fornell and Larcker, 1981). Table 3 presents the Fornel-Larcker criterion for discriminant validity.

Table 3: Fornell–Larcker criterion discriminant validity

	DS	IT	KS	SB	TI
DS	0.787				
IT	0.695	0.809			
KS	0.357	0.317	0.765		
SB	0.316	0.273	0.977	0.800	
TI	0.523	0.514	0.743	0.622	0.662

The Heterotrait-monotrait correlation coefficient (HTMT), which needs to be less than 0.90, was used for the second assessment of discriminant validity (**Gold et al., 2001**). Table 5 demonstrates that all values were less than 0.90, proving that the data does not have any problems with discriminant validity.

Table 4: HTMT discriminant validity

	DS	IT	KS	SB	TI
DS					
IT	0.349				
KS	0.432	0.677			
SB	0.578	0.273	0.431		
TI	0.492	0.654	0.493	0.271	

4.4. Structural model

In the PLS SEM the second phase is assessment of structural model that is done by Bootstrap. In this step there several methods to determine the model. In study p-value was examined to find the results of hypothesis. In the next step R2 value was 0.621 in figure 1 (R2 is a measure of how much of the variance in an endogenous variable can be accounted for by external factors) (Chin, 2010), and Q2 (The acceptable value of Q2 value was 0.357, which denotes the overall influence of the endogenous variables, must be greater than zero) are identified (Henseler, Ringle & Sinkovics, 2009). The figure 1 shows the result of the structural model of the hypothesis test. The t value must be greater than 1.96 to accept the research hypothesis when the research hypothesis is tested with 95% confidence level, with 5% error, and the p-value is less than <0.05. The study's findings indicated that the first hypothesis data sharing has positive impact on knowledge sharing was accepted because the t-statistic was 2.932 > 1.96 and the p-value was 0.029 < 0.05. A prior study supported this outcome (Eid and Al-Jabri, 2016). In the study the second hypothesis information technology has positive impact on knowledge sharing because t-statistic value is 2.158, where the p-value is 0.034, the second hypothesis was accepted. This result was consistent with what was reported by Rahab and Wahyuni (2013).

Table 5: Result of hypotheses

Hypotheses		β	Sample Mean	Standard Deviation	t-statistics	p-values	Results
H1	DS->KS	0.311	0.235	0.103	2.932	0.029	Accepted
H2	IT->KS	0.283	0.367	0.094	2.158	0.034	Accepted
H3	TI->KS	0.245	0.281	0.142	2.214	0.025	Accepted
H4	SB->KS	0.313	0.063	0.081	0.572	0.561	Rejected

The study finding regarding third hypothesis technology infrastructure had a significant impact on knowledge sharing among Students. Third hypothesis was accepted because value of t-statistic 2.214, and p-value was 0.025. The similar results when they found significant impact of information technology on knowledge sharing.

In the study the fourth hypothesis indicate that Shared Benefits had not significant impact on the knowledge sharing among Students, p-value 0.561 > 0.05 and t-statistic less than 1.96; hence H4 was rejected. This result was consistent with previous work (Wangpipatwong, 2009).

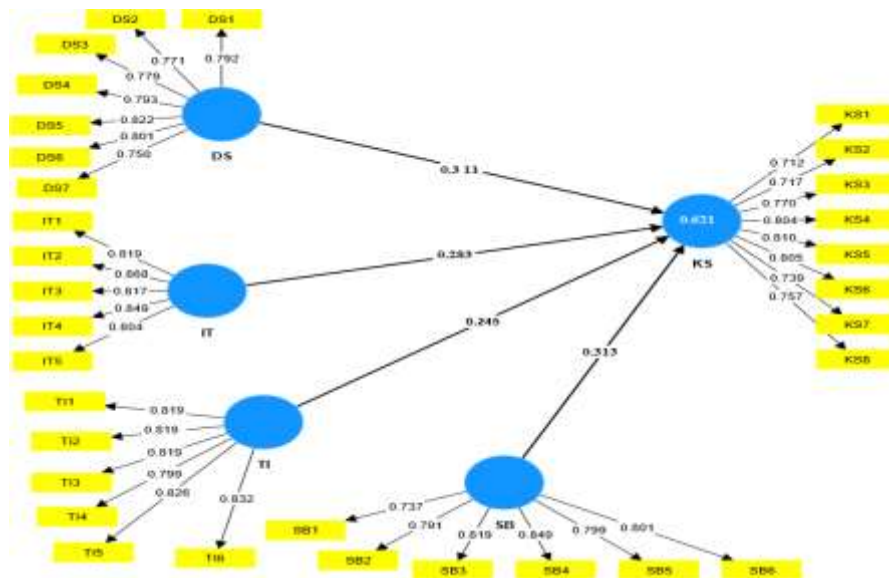


Figure 1: Structural model

5. Discussion

This study examined several factors that predict knowledge sharing among students of higher education institutions of Jamshoro education city at Sindh province of Pakistan. Knowledge sharing plays an important role in the education of Pakistani institutions, as seen in this study. Sharing knowledge offers Pakistani university Students the opportunity to further their research and skills development and higher education.

The first hypothesis was accepted; it describes how knowledge sharing is impacted by data sharing and has the highest information technology forecast when compared to other components. This conclusion is supported by a previous study (Eid and Al-Jabri, 2016). The sharing of knowledge among students depends on the sharing of data through social networking sites. Additionally, information sharing and data sharing would have a major positive influence on learning efficiency, which is closely related to students' learning. Data sharing is necessary to bolster the theory that information sharing enhances research learning. Including social networking technologies for data exchange and other purposes can also be considered wise.

Additionally, a second hypothesis on how students' perceptions of happiness affect their sharing of knowledge was upheld. The outcome is consistent with Rahab and Wahyuni's (2013) findings. This finding demonstrated that students love sharing their knowledge with other students, which is why they do it. The findings demonstrated that students are willing to impart their knowledge, which eventually helps other pupils. The research demonstrates that students' primary source of intrinsic motivation was exchanging knowledge on social media. Furthermore, students imparted their knowledge because they thought it would be enjoyable and stimulating to assist others in solving problems—a belief they hold today. Information technology, together with Mousa et al. (2019), has an impact on university students' knowledge sharing. Information technology in computer science is therefore essential to ensuring that the standard of instruction and learning fits the needs and lifestyles of students. Additionally, via the use of information technology, students will comprehend the ideas taught in computer science. Higher education institutions can effectively encode, embed, and distribute student content using information technology in a variety of ways to promote student engagement and teamwork.

Information technology can therefore aid in digitizing access to and speedy retrieval of knowledge sharing information, so expanding the chances for students to impart their professional experiences, abilities, and knowledge to others. However, pupils' knowledge of computer science is largely unaffected by the availability of technology. This outcome validates Wangpipatwong's earlier research (2009). This could be the case since students have personal gadgets that permit KS and the university has dependable IT equipment, systems, and infrastructure. As a result, there is no scarcity of technology in colleges, and students are not aware of it. When giving knowledge, a student who anticipates reciprocity from other participants will provide more insightful and creative input and will be more satisfied with the computer science.

In addition, one kind of mutual value known as mutual benefit occurs when people believe that the actions they take now will help them later on. They anticipate receiving something in return for their earlier, resolute action. Students who anticipate reciprocity from their peers will also give more creative and helpful ideas. Additionally, your contentment with reciprocity will enhance knowledge sharing. Students spend time assisting one another, responding to inquiries from one another, and attempting to exchange ideas. Sharing of knowledge is consequently encouraged by a strong sense of mutual benefit.

5.1. Limitations and Future Studies

According to this study, knowledge sharing among university students was raised by data sharing, apparent enjoyment, information technology, and perceived reciprocity. Additionally, the file sharing was anticipated by knowledge sharing, indicating that students shared documents, assignments, projects, and other materials via social networks. However, students' knowledge sharing was unaffected by technological availability, which may point to the university's strengths. The research revealed a number of shortcomings. First off, because the study was conducted at a three universities, it is not possible to generalize the findings to all other universities. Second, compared to public universities, the study was carried out at a private university, which had a different atmosphere. Third, no causal effects of these variables on sharing knowledge were discovered by the study, which solely looked at the direct effect. Future studies could get beyond the aforementioned restrictions by looking at the mediator's function in determining the causal linkages between outcomes and by looking at many universities. Similarly, surveys at both public and private universities can be used to find out how students feel about computer science.

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