Virtual learning enriched by social capital and shared knowledge, when moderated by positive emotions

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Abstract: The higher education sector has reported degrading teaching-learning quality. In parallel, Middle Eastern countries strive to improve education systems and face similar global challenges. The education system transforms its teaching-learning quality via e-learning strategies, where student interact while sharing social capital of resources within a virtual environment during participating to share knowledge. Past research assessed the role of social capital on knowledge sharing behaviour in virtual communities but in sectors other than the higher education. Also, past education research made proclamations with improper evidence. Henceforth, this study assesses the role of students' social capital (using social capital theory) on knowledge sharing behaviour while e-learning, and the moderation of positive emotion. This deductive approach's reviewed literature proposed five hypotheses, which when tested using multi-correlation analysis, on undergrad business students of Ahlia University, Bahrain; support all hypotheses. Also, implications to theory and practice and proposed in this article.

Keywords: social capital theory; knowledge sharing quality; positive emotions; higher education sector.

Reference to this paper should be made as follows: Razzaque, A. (2020) 'Virtual learning enriched by social capital and shared knowledge, when moderated by positive emotions', *Int. J. Electronic Banking*, Vol. 2, No. 1, pp.77–95.

Biographical notes: Anjum Razzaque is an American and British educated academic and Assistant Professor and Chairperson of the Management Information Systems Department at Ahlia University – Bahrain. His research spans from healthcare knowledge management, FinTech, big data analytics to higher-education teaching and learning. His research led him fellowship and research grants from US-funding institutions. He also serves the academic community as a keynote speaker, conference chair, session chair, and a reviewer.

1 Introduction

Past research advocates the importance of e-learning for students, while at the same time reports the lack of their interest to interact while learning online. The drop in interactions leads to dying of a virtual community. However, unfortunately there is lacking evidence to suggest why e-learning activities also influenced by such participative activities. It is

no wonder why instructors struggle enriching e-learning with interactions. In the higher education sector, the same is the case, where the millennial students shy away from interacting, though they are addicted to the social media. The issue is that research reports that it is unclear whether these interactions are for making friendship networks or for sharing knowledge; with suspicion that it is more for making friendships online (Kunthi et al., 2018; Yilmaz, 2017a, 2017b; Hwang, 2014; Sohrabi and Iraj, 2016).

Still, regarding research reports on significant factors that positively affect learning outcomes, motivation and positive emotions, and such factors are getting recognised for their impact on learning; especially in higher education sector. Despite such outcomes, scant research investigated the students' feelings of positive emotions (pride, joy and hope positively correlate with students' academic self-efficacy, academic interest, and overall achievement) in affiliation with their knowledge sharing behaviours, as well as, the social capital of resources that they share and store within such e-learning environments. This is though there is a high rate of adoption of information and communication technologies amongst customers of various service providers: particularly the case of smaller cities in Asia (Naidu and Sainy, 2018) – as in line with the case of countries like Bahrain in the Gulf region. Past research has assessed the effect of social capital of online community members on their knowledge sharing behaviour, but such research was generalised on contexts other than the higher education. For instance, Chiu et al. (2006) assessed the relationship between social capital theory and knowledge sharing quality, along with other variables, by collected data, for quantitative analysis, from a virtual community whose members are IT professionals sharing knowledge about database or programmers. Another example is Chang and Chuang (2011) who assessed similar earlier mentioned relationship but the target population was any participant who has is a member of a virtual community.

Further, social capital of resources is virtually shared in the form of knowledge when students are motivated to indulge in self-directed and motivated learning. This is when an individual take self-initiative and diagnoses learning needs and goals, identifies resources to learn from, selects appropriate learning strategies and pursues to read learning outcomes (Rager, 2013). Social capital of resources are built on the foundation of sharing knowledge and skills while peers interact within virtual environments (Chang and Chuang, 2011; Chiu et al., 2006). The higher education sector, particular in developing countries, has recognised the importance of knowledge sharing, and knowledge management tools like virtual communities, for improving education teaching-learning quality by seeking best practices for effective implementation of knowledge management tools (Lee, 2018). Furthermore the Gulf Cooperation Council region of the Middle East and North Africa region has generously invested in its higher education, and in general the education, sector as this region recognises the relation between investing in education and reaping the economic growth of its region to diversify and become knowledge economies of the 21st century (Costandi and Hamdan, 2015; Hamdan and Costandi, 2015; Hamdan, 2015). Therefore, this research aims to study how factors such as positive emotions affect social capital theory and knowledge sharing.

Next, Section 2 critiques literature, and theory is built to propose five hypotheses. Section 3 entails the design of this study's research method, survey design and then procedure for data collection and analysis. Section 4 describes the data analysis specifying evidence-based support of all the hypotheses of this study. Lastly, Section 5 discussing the findings of this study, connects them with this study's critiqued literature

and hence expresses its limitations and propositions for future research. Moreover, implications to theory and practice are also expressed in this section.

2 Theoretical background and hypotheses

2.1 Social capital and knowledge sharing

To understand the concept of e-learning one has to comprehend the ideology of virtual environments where knowledge is shared. The term virtual community stemmed from the term community of practice: described using social capital theory (Chang and Chuang, 2011) and social cognitive theory (Chiu et al., 2006), etc. SCT is networks participation through relations to exploit social capital of resources (Mones et al., 2015; Stets and Serpe, 2016). Social capital of resources belong in group social structures within a learning-centred VC (Mones et al., 2015). In past research, social capital theory was reflected through bonding and bridging of social capital theory's structural, relational and cognitive dimensions, e.g., Chiu et al. (2006), Chang and Chuang (2011), Malgonde and Bhattacherjee (2014), and Warren et al. (2015). The structural dimension is participants' connections through know-who formed interaction ties. The relational dimension reflects participants ties based on trust, norms of reciprocity and identification. Trust indorses the sharing behaviour of knowledge and norms reflect participants' collectivity. The sharing of knowledge occurs via participants' norms. Cognitive dimension reflects participants' systemic depiction through common beliefs and customs. Stories and myths aid participants during knowledge sharing via shared language and shared vision (Chiu et al., 2006; Huysman and Wulf, 2006; Malgonde and Bhattacherjee, 2014). Using social capital theory describes social networks, like Facebook, and helps analyse virtual interactions. Though VC participation is a current trendy research area (Park et al., 2014); only few studies described VCs through members' participation, using social capital theory, by empirically investigating how social capital aids the sharing of knowledge (Chiu et al., 2006; Chang and Chuang, 2011; Warren et al., 2015). Virtual communities are informal platforms valuing both types of knowledge (tacit and explicit), composed through experience, making virtual communities education-based structures (Bentley et al., 2010). The structural dimension of the social capital theory expresses social interactions ties are the strength of social relations creating SC of resources through emotional support and ideas sharing through participants' network ties. Such social capital of resources is created through interactions during team collaborations, and this is possible through knowledge exchange (Nicolini et al., 2008; Ellison and Steinfield, 2010; Magnier-Watanabe et al., 2010; Chang and Chuang, 2011; Jansen et al., 2011; Mascia and Cicchetti, 2011; Warren et al., 2015). Interactions facilitate knowledge transfer so knowledge sharing occurs in virtual communities, to deepen members' knowledge and expertise (Girard and Lambert, 2007; Alwis and Hartmann, 2008). From the perspective of the relational dimension of the social capital theory; knowledge sharing requires communal ties to encourage integrity for voluntary knowledge shared interactions (Edelenbos and Klij, 2007; Chang and Chuang, 2011; Chiu et al., 2006) where knowledge sharing behaviour is answering questions, offering opinions or suggestions. Virtual communities are considered as weak tie networks but where members meet face-to-face are strong ties networks; as similar in blended classrooms, where the actual higher education classes occur face-to-face, with e-learning as a supplementary facilitator

of teaching and learning. Most of previous research focused on strong network ties; while there is not much research on weak tie communities, hence there is a need to wonder why participants still volunteer to participate in weak tie VCs. Some scholars doubt if there is any shared quality knowledge within weak ties (Park et al., 2014). Hence, it would be important for this study to assess how virtual environments facilitate students' knowledge sharing when e-learning though these are supplemental activities, and as observed by the author of this study, such peer networks (of students and instructors) are weakly linked together as students shy away from interacting while e-learning, an observation particularly at Ahlia University, Bahrain. Bahrain is one of the countries that are part of the Gulf Cooperation Council region of the Middle East, with other countries being Kuwait, Oman, Qatar, and the Kingdom of Saudi Arabia (Al-Sartawi and Reyad, 2018; Alajmi and Rorissa, 2018). Based on this argument:

H1a Social interaction ties have *a positive and a significant effect on the quality of knowledge sharing*.

Trust, variable of social capital theory's relational dimensions, harbours virtual community members' confidence to improve knowledge sharing (Chang and Chuang, 2011). In a virtual community a trustworthy relations reduce uncertainties to support for mutual benefits (Kim et al., 2008; Warren et al., 2015). Also, it is the willingness of a participant to engage in knowledge sharing; initially predicting a risky behaviour. Trust is only measurable after an event's outcome is reached. Trust, of all other social capital theory variables, is the most important and influential for DM (Jøsang, 1999; Edelenbos and Klij, 2007; Sifer-Rivière et al., 2010); playing a major role during knowledge sharing since due to trust-based knowledge sharing occurs when collaborating making decisions (Mascia and Cicchetti, 2011). A trustful relation enhances the learning process within classrooms, where within a trusting environment students are more likely to accomplish their course objective and intended learning outcomes (Zelihic, 2015). Based on this argument:

H1b Trust has *a positive and a significant effect on the quality of knowledge sharing*.

Effective collaboration involves effective information processing where human information processors interconnect with each other within a network. Such interactions deem fruitful once the group participants follow the group norms of reciprocity, i.e., group norms: accepted group standards where favouring and expecting is normal in return for knowledge sharing (Chang and Chuang, 2011). Norms of reciprocity is a variable of social capital theory's relational dimension. This way, a group is able to reach consensus once its members share information with one another (Magnier-Watanabe et al., 2010; Postmes et al., 2001). The social capital of embedded resources influences knowledge sharing in members' networks. This is possible when social networks affect human behaviour in close ties to share knowledge within a community. Previous studies have empirically assessed the social capital theory and knowledge sharing relationship, e.g., Chiu et al. (2006), and Chang and Chuang (2011). In a virtual community; since there is no motivation to reinforce trust, interactions and reciprocity between participants, reciprocity improves attitude for knowledge sharing. If this expectation drops so does the knowledge sharing behaviour (Chiu et al., 2006). While group members become aware of each other's identity; group, knowledge is shared across tasks (Austin, 2003). In such circumstance, reciprocity becomes fundamental for the cognitive process of human beings (students as in the case of this study) to cooperation within group, to learning and

performing collaboratively to accomplish a task/assignment. A cooperating is especially possible if the group members have had a positive experience working together in the past (Biele et al., 2008). It is also important for instructors to moderate the interactions with student groups to assure that there are plosive interactions, since a one negative behaviour will cascade into another negative behaviour, and this according to the reciprocity theory, is the immediacy theory of one individual leads to a similar behaviour by another individual behaviour (Allen et al., 2008). Therefore, norms of reciprocity enhance knowledge sharing quality in virtual environments:

H1c Norms of reciprocity have *a positive and a significant effect on the quality of knowledge sharing*.

Shared vision, another variable of social capital theory's cognitive dimension, is a required understanding for knowledge sharing; inspired through similar interacting perception in a virtual community environment (Li and Li, 2010). In an organisation, shared vision is formed through the common goals and aspirations that unite the members. This becomes a bonding instrument for integrating and relating resources, i.e., those with a shared vision are most likely, willing to share resources with one another. Therefore, in a VC where participants bond by common goals and interests; shared values and goals comparatively bond each other for knowledge sharing. Shared vision, gives them a meaning and a value for sharing knowledge in a virtual community environment (Chiu et al., 2006). Within the higher education sector, traditional campuses are designed with common places, like library learning zones, where students gather in a common vision to learn. Such environments prove fruitful for the learning process. This is because a common vision is mandatory to ensure a learning process (Weiner et al., 2010). Similar during the start of the semester the instructor explains to students the syllabus in order to create and communicates a vision focused on information literacy and learning, within a school that is a community of various teaching and learning stakeholders, while engaging students to promote a vision of what matters most for the instructor and students successful teaching and learning. Vision is common for instructors and students. For the instructors it harvests beliefs and values of how a class a taught and this is a driver for community for teaching quality during the class. Though seeming straight forward, such a rationale seems to express 'a few shades of' disagreements between instructors who are disunited in their methods of teaching during class (Fountas and Pinnell, 2018). As a result, the important is the role of a common vision for virtual environments, like virtual communities where e-learning occurs, is important to understand, so to be able to recognise how common vision, along with interaction ties, trust and reciprocity effect the sharing behaviour of quality knowledge. Such an understand may shed new light as to how curriculum designs can be improved to better serve students, particularly in e-learning environments. Henceforth, shared vision enhances knowledge sharing quality:

H1d Shared vision has *a positive and a significant effect on the quality of knowledge sharing*.

It is important to take notice at this stage that the literature critiqued to propose Hypotheses 1 (1a, 1b, 1c and 1d) are theories from scholars who have investigated the relation between social capital theory and knowledge sharing quality, in domains other than the education sector. The reason is since there is think literature that assesses the role of virtual environment, to underrated e-learning, from the point of view of social capital

theory, though such a dimension deems a valuable contribution. The rationale here is that only once this study establishes a comprehensive and empirical understanding of how social capital theory effects knowledge sharing, then only will curriculums are able to furnish the effective teaching-learning strategies to harness the power of such a relationship.

2.2 The role of positive emotions on student success

Emotions play an immense role in learning especially for higher education students. By joining emotions with growing recognition of the impact of emotional well-being on student's academic success will help introduce new ways of teaching which will lead to a successful change in learning theory and practices (Rowe et al., 2013). In addition, according to Williams et al. (2013): all the studies of positive emotions report that whenever a student is positive this will lead him to glorious achievements and it also shows that the emotions of the student affects his concentration and the way he receives knowledge and how much focus he gives to the tutor. Positive emotions and emotional intelligence play in experiential learning. Students' field practicum journals were analysed using the Linguistic Inquiry and Word Count Program (LIWC) and a measure of emotional intelligence was obtained using the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) (Abe, 2011). Moreover, research on multimedia learning has begun to consider the influence of affective processes, such as emotions based on the established fact that emotions influence cognitive learning processes (Park et al., 2015). On the other hand, Emotional intelligence describes and operationalises adaptive emotional functioning Perception; understanding, and managing emotions effectively in the self and others are described as core competencies in most operationalisation's of emotional intelligence, Higher levels of emotional intelligence are associated with a variety of general positive intrapersonal outcomes (Schutte and Natasha, 2014). Vulpe and Dafinoiu (2011) observed that people who were positively influenced by positive thoughts, exhibited higher levels of creative thinking, than the neutral group; while, from another observation, there was no reported variance in the performances in association with creative thinking.

Another emotions concept is discussed in an article by Rahimi et al. (2014). It mentions the broaden-and-build theory, one of the primary focuses in the field of English language teaching is on interventions, either at the level of material development or teaching strategies and learning tasks, aimed at not only fostering positive emotions in language learners and but also preventing or minimising negative emotions. On the other hand, Bondarenko (2017) explains that some studies of the role of positive emotions in learning goals achievement show that pride, joy and hope positively correlate with students' academic self-efficacy, academic interest, and overall achievement. Another explanation to this indirect relationship between positive emotion and academic achievement can be provided through activation. Bondarenko also explains that Pekrun's cognitive-motivational model differentiates between emotions of enjoyment of learning, hope for success or pride, which are considered positive emotions, and emotions of relief, relaxation after success and contentment, which are positive deactivating emotions.

Bhatti et al. (2016) stated that for sustaining subsidiary growth organisations need to manage, store, transfer, and manage knowledge, and learning and sharing of such a

knowledge is based on acquiring knowledge, and such processes keep the internet alive. As mentioned by Al-Sartawi (2018) the internet has helped the world thin up the conformist boundaries that once existed. Such a topic lack in-depth research. Chang (2016) revealed that investment in human resources is basic to the improvement of human capitals. To encourage better learning and training activities, the use of online resources have been blended successfully with education. Rovai (2002) explained in his article that the purpose of this study was to explore the factors that influence students' community experiences, to develop and field test the classroom community scale and to determine its validity and reliability for use with postsecondary students taking online courses. When educational researchers are armed with an effective tool to measure community in a learning environment, they will be better equipped to conduct research on how to design and deliver instruction at a distance in order to promote community.

Additionally, by implication, to promote satisfaction and instructors, and other learners, but without the requirement to be online at the same time (seeking into Putnam, 1995). Social support can also be recognised as a form of social capital in the workplace. The term of social capital is defined as 'features of social organisation such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit'. From the perspective of emotional exclusion; a brief introduction to what emotional exhaustion is defined. It is defined as being overstretched and exhausted, and this has a huge mental impact on students while they are learning. Students who work while attending college may face time limitations and other added stressors, which may ultimately lead to emotional exhaustion. Additionally, an increasing number of non-traditional and re-entry students are attending college. These individuals may be required to juggle work, school, and family life (King and Bannon, 2017). From the instructor's point of view; research has found that the desired characteristics of effective teachers have been consistent during the past three decades. For instance, communication and understanding skills are essential characters that characterise effective teachers. Going through in order for a teacher to have a good attribute among his students he needs to be fair and equal towards his students (Grunenwald and Ackerman, 1986). Having a good time throughout the lesson and not sticking to teaching only, and is the main reason of students getting bored, during the lesson and having some entertaining time makes it more interesting for students. By creating more than one teaching technique to keep then enthusiastic towards the course they are studying (Paraskevas and Sigala, 2003). Moreover, the more the teacher interacts and makes the student interested in the course, this will cause positive emotions towards not only one student but the whole class. Creating such positive environments inside a classroom is more likely to make students ready and motivated and this should lead to greater intellectual involvement. Hence, the roles of the instructors have a huge impact and a big way to test how positive emotions can affect the way of teaching the students and keeping the environment of the class positive like it should be and this may lead to success. As a result, positive emotion moderate between the social capital of students and their knowledge sharing beaveries; such that:

H2 Social capital of students has a stronger positive effective on quality of knowledge sharing behaviour when students have a higher level of positive emotions.

3 Research methodology

3.1 Sampling, data collection and instrument

The questionnaire was developed using Google Forms (Razzaque, 2018), and distributed to the undergraduate business students from Ahlia University in Bahrain was distributed amongst undergrad students of Ahlia University's College of Business and Finance. Ahlia University is one of the private higher education institutions in the Kingdom of Bahrain, with its five colleges and it hosts a number of online teaching-learning platforms, one of its e-learning platforms is Moodle (Debab and Hamdan, 2015). The target population was particularly those students who have encountered blended teaching and learning, i.e., where face-to-face teaching and learning blends with e-learning. The primary tool for e-learning at Ahlia University is Moodle. Also, it was important to consider those students who have experienced positive emotions during their course of study. As a result, this study was able to attain data from 166 male undergrad business students (53.2% response rate) and 146 females business students (46.8% response rate), hence bringing a total to 312 participants, as depicted in Table 1.

Table 1 Gender

	Frequency	*Percent*
Male	166	53.2
Female	146	46.8
Total	312	100.0

Google form was utilised to make and spread the survey for the research. Ahlia University's Moodle and social media apps were used to distribute the questionnaire. The survey items were adapted from various scholars. Social capital theory (independent variable as depicted in Figure 1) was adopted from Chang and Chuang (2011). Knowledge sharing quality (dependant variable as depicted in Figure 1) was adopted form Chiu et al. (2006). The moderator variable: positive emotions (Figure 1) were adapted from Septianto and Chiew (2018). Hence, the Figure 1 research model is an integration of three variables: social capital theory, knowledge sharing quality and positive emotion. Table 2 depicts the variables' functioning definitions.

Table 2 Defining Figure 1 model variables

Variable	*Definition*
Social capital theory	Social capital is resources shared by students in a group, and this resource is banked as a social capital of resources within the group when students share their skills, experience and information with each other (Alshaikh et al., 2017; Razzaque et al., 2013).
Knowledge sharing	A behaviour that is also a knowledge management process, and vital for communal participation (Alshaikh et al., 2017; Razzaque et al., 2012, 2013).
Positive emotion	An emotional intelligence to be positive of joy, gratitude, inspiring interest and hope (Alshaikh et al., 2017).

The survey was designed based on a five-point Likert scale, with 1 being 'strongly agree' and 5 being 'strongly disagree' to measure the variables. The survey was divided into

four sections. Section A includes a cover letter, introducing participates to the research, assuring voluntary and confidentiality from participation, followed section B with four demographic: level of education (first, second, third or fourth year), student status (full time student or part time student, or other) and gender. Sections B, C and D included the items pertaining to social capital theory, knowledge sharing quality and positive emotions. Table 3 depicts the descriptive statistics pertaining to the demographic items and items pertaining to the independent, moderating and dependant variables of this study's model.

Figure 1 Concept model

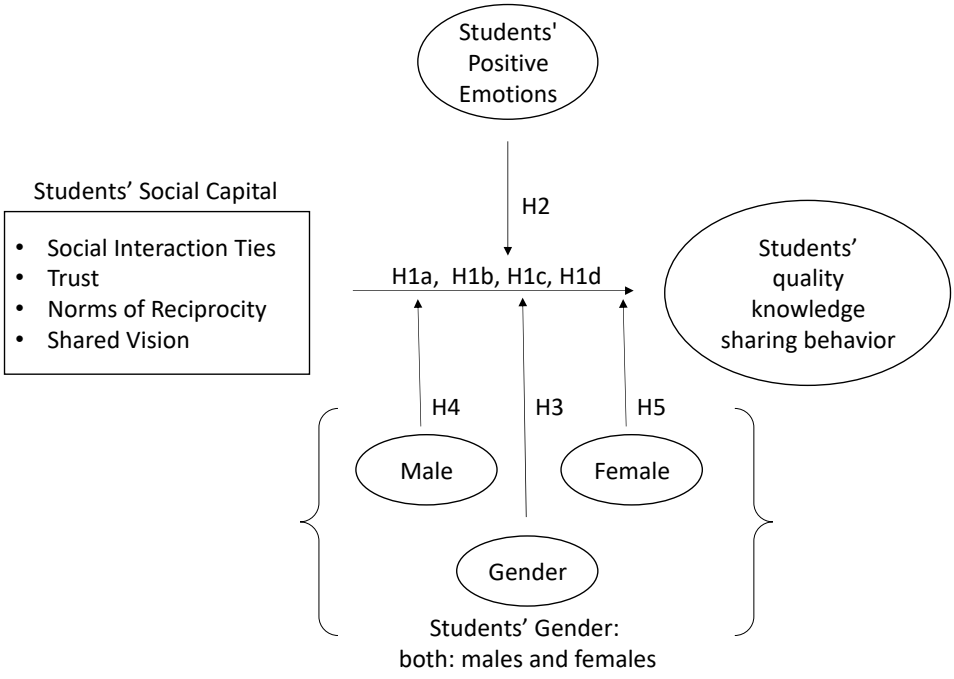

Table 3 Descriptive statistics

Variables	*N*	*Min.*	*Max.*	*Mean*	*Std. deviation*
Gender	336	1	1	0.51	0.501
Student status	336	0	1	0.81	0.391
Education level	336	0	3	2.11	1.122
Social capital theory: social interaction ties	336	1	5	1.926	0.713
Social capital theory: trust	336	1	5	2.056	0.734
Social capital theory: norms of reciprocity	336	1	5	1.984	0.795
Social capital theory: shared vision	336	1	5	2.002	0.781
Knowledge sharing quality	336	1	5	1.810	0.68
Positive emotions	336	1	5	2.033	0.713

4 Data analysis

SPSS 23.0 was used for data analysis of 336 responses. Before the analysis was carried out, however, the data was filtered to meet the research needs of students who have experience with positive emotions during the course of their studies. All variables depicted in Figure 1 and Table 2 was included for testing the hypotheses.

4.1 Descriptive analysis

Information on respondents such as demographics can be found in Table 4, depicting the gender rundown, student status at Ahlia University (full time or part time student, or other). 257 represent 82.4%, part time students represent were 55, representing 17.6%, while the other category was 11, representing 3.5%. Table 4 shows the level of education the respondents have chosen from first to fourth year, as most university majors are completed in Bahrain within four years. The majority of respondents were students in the fourth year, population (181 respondents – 54.2% response rate); full time students (274 respondents – 81.3% response rate), and those were females (170 respondents – 50.6% response rate).

Table 4 Demographics characteristics of respondents

Sample characteristics		*Frequency*	*Percent*
Gender	Male	166	49.4%
	Female	170	50.6%
	Total	336	100%
Student status	Full time student	274	81.3%
	Part time student	63	18.8%
	Other	0	0%
	Total	336	100%
Education level	First year student	50	14.9%
	Second year student	44	13.1%
	Third year student	60	17.9%
	Fourth year student	181	54.2%
	Total	336	100%

Table 5 Cronbach's α value of variables

Variables	*Cronbach's α*	*N of items*
Social capital theory: social interaction ties	0. 802	3
Social capital theory: trust	0.802	4
Social capital theory: norms of reciprocity	0.7	2
Social capital theory: shared vision	0.809	3
Knowledge sharing quality	0.826	4
Positive emotions	0.838	6

Table 5 depicts all Cronbach's α exceeding 0.6; acceptable (Chang and Chuang, 2011): ranged from 0.7 to 0.838, indicating all variables' items being reliable. Next, instrument's discriminant validity assessed correlation analysis (as depicted in Table 6) between variables. If p-values are below 0.05, then relations are correlated. Some relations were not, e.g., trust and social interaction ties: $r = .74$, $p < 0.01$, but others were, e.g., knowledge sharing quality and learning social interaction ties: $r = 51$, $p < 0.01$. Those correlations that are below 0.7 are acceptable correlation values (Riquelme and Rios, 2010).

Table 6 Pearson correlation statistics with p-value = 0, N = 134

Variables		*1*	*2*	*3*	*4*	*5*	*6*
1	Social interaction ties	1					
2	Trust	.74**	1				
3	Norms of reciprocity	.64**	.71**	1			
4	Shared vision	.62**	.66**	.61**	1		
5	Knowledge sharing quality	.51**	.55**	.5**	.54**	1	
6	Positive emotions	.64**	.51**	.65**	.6**	.55**	1

Note: **Correlation is at the 0.01 level (two-tailed).

Further, convergent validity assessed hypotheses testing. Table 7: thus supporting all hypotheses. H1, H2, H3, and H5 were positively significant should express acceptable β values when t-values ranges from –7.48 to 12.38 (Riquelme and Rios, 2010). As per Table 7, the weakest hypothesis was: H2: NC's UA → learning outcomes (β = .176).

4.2 Hypothesis testing

Table 7 shows that if significant levels fell below 0.05, the variables would be statistically correlated. A significant positive correlation exists between social capital theory and sharing of quality knowledge, $r^2 = 0.291$, $p < 0.05$. In addition, there is a positive correlation between social capital theory knowledge sharing moderated by positive emotions $r^2 = 0.319$, $p < 0.05$. As shown in the table, gender moderation has a significant impact on the relationship between social capital theory and knowledge sharing quality, with gender (male) representing 29.1% and increasing to 32.2%, particularly when male gender has been introduced as a moderator. This is not the case for women since r^2 fell from 29.1% to 25.6% and therefore the gender as a whole (male and female): r^2 fell from 29.1% to 2.5%. This therefore demonstrates support for the Hypothesis 4 that males moderate to make it easier for social capital to share knowledge while experiencing positive emotions.

4.3 Regression analysis

To test the hypothesis, multiple regression tests were performed as shown in Table 7. Hypotheses 1, 2 3, 4 and 5 are significantly accepted. There is a positive relationship between the theory of social capital and the sharing of knowledge, $\beta = 0.540$, $p < 0.05$. In addition, since there is a positive relationship between the theory of social capital and the sharing of knowledge, the addition of positive emotions as a moderating variable

enhanced the relationship, which shows that they all have a strong effect on each other, $\beta = 0.565$, $p < 0.05$. However, adding gender as a moderator significantly reduces all values from $\beta = 0.540$ to $\beta = 0.159$, $p < 0.05$. To further investigate why gender has a negative impact on the relationship, each gender has been separated and interpreted to discover the root of the problem. When the female gender was introduced as a moderator, however, it showed a negative relationship with SCT and KSQ, $\beta = 0.506$, $p < 0.05$. Respectively, when male gender was introduced as a moderator, it showed a positive relationship with social capital theory and knowledge sharing quality as the beta increased to $\beta = 0.568$, $p < 0.05$. Which shows the problem lies with the female gender findings.

Table 7 Hypotheses testing

Model	*Relationship between variables*	*F*	*t*	R^2	β
M1	Social capital theory → knowledge sharing quality	127.431 Sig 0.00	11.289 Sig 0.00	29.1%	0.540
M2	Positive emotions * social capital theory → knowledge sharing quality	145.478 Sig 0.00	12.061 Sig 0.00	31.9%	0.565
M3	Gender * social capital theory → knowledge sharing quality	8.060 Sig 0.005	2.839 Sig 0.005	2.5%	0.159
M4	Male * social capital theory → knowledge sharing quality	77.936 Sig 0.00	8.828 Sig 0.00	32.2%	0.568
M5	Female * social capital theory → knowledge sharing quality	49.564 Sig 0.00	7.040 Sig 0.00	25.6%	0.506
H1a	Social capital theory's social interaction ties → knowledge sharing quality	118.637 Sig .00	2.049 Sig 0.04	26%	0.139
H1b	Social capital theory's trust → knowledge sharing quality	142.34 Sig 0.00	2.533 Sig 0.01	29.7%	0.192
H1c	Social capital theory's norms of reciprocity → knowledge sharing quality	109.3 Sig 0.00	1.847 Sig 0.07	25%	0.121
H1d	Social capital theory's shared vision → knowledge sharing quality	135.2 Sig 0.00	3.967 Sig 0.00	28.8%	0.247

H1 Social capital theory has *a positive and a significant effect on knowledge sharing quality*.

H1a Social capital theory's social interaction ties have *a positive and a significant effect on quality of knowledge sharing*.

H1b Social capital theory's trust has *a positive and a significant effect on quality of knowledge sharing*.

H1c Social capital theory's norms of reciprocity have *a positive and a significant effect on quality of knowledge sharing*.

H1d Social capital theory's shared vision has *a positive and a significant effect on the quality of knowledge sharing*.

H2 Social capital of students has a stronger positive effective on quality of knowledge sharing behaviour when students have a higher level of positive emotions.

H3 Social capital of students has a stronger positive effective on quality of knowledge sharing behaviour when moderated by gender.

H4 Social capital of students has a stronger positive effective on quality of knowledge sharing behaviour when moderated by the male gender.

H5 Social capital of students has a stronger positive effective on quality of knowledge sharing behaviour when moderated by the female gender.

4.4 Advance discerption analysis

Male counts are 166 and female counts are 146, bringing the total to 312. As shown in Table 8, there is a slight difference between men and women, as the male findings precede the female, but nothing that would have a major impact on the study. Both genders have nearly the same results.

Table 8 Difference between genders

Variable	*Gender*	*Mean*	*Standard deviation*
Positive emotion	Male	4.0206	0.74205
	Female	4.0049	0.64353
Social capital theory	Male	4.0608	0.59613
	Female	4.0138	0.62180
Knowledge sharing	Male	4.2740	0.66328
	Female	4..2089	0.61520

5 Discussion and conclusions

This study aimed to assess the role of students' social capital on their sharing of quality knowledge, within virtual communities like Moodle. Also the moderating role of their positive emotions is assessed to understand the extent to which positive emotions facilitate the relationship between social capital theory (i.e., to assess students social capital) and knowledge sharing quality. Furthermore, also the moderating role of gender, male and female were assessed, as addition SPSS multi-regression analysis, to further understand the role of gender between the just mentioned relationship, also depicted in Figure 1. Firstly, a positive relationship exists between social capital theory and knowledge sharing, as evident in the analysis of data, $\beta = 0.540$, $p < 0.05$. This makes social capital a valuable mechanism through which universities can share knowledge. For this reason, universities are suggested to increase confidence, networks and standards between lectures in order to facilitate knowledge sharing. The process of knowledge sharing could be accelerated through such a strong relationship (Harjanti and Noerchoidah, 2017). This outline stresses the importance of the contextual point of view in information and the sharing of knowledge. In particular, the dimensions of social

capital mean the roles of structures and relationships that differ according to context (Widen, 2011). The second quality of construct is the outcome of positive emotions on social capital theory and knowledge sharing which likewise presented a positive relationship between them. As shown by Pearson (2016), almost 78% of lecturers admit that digital education has benefited their students in their classrooms, encouraging them to integrate e-learning into their daily classes. The third construct was assessing the impact of both genders on social capital theory and knowledge sharing quality. This structure showed a negative connection. The β value for social capital theory and knowledge sharing was $\beta = 0.540$; which fell to $\beta = 0.159$ when both genders were commenced. To broaden our understanding, so to comprehend why such a phenomenon occurred, the genders construct was divided into their own distinguishing characteristics of male and female. Either both genders take on a negative relationship between social capital theory and knowledge sharing quality relationship, or one of them expresses a negative relationship. As a result, when the male gender was introduced as a moderator in the Figure 1 model, a positive relationship occurred between the social capital theory and knowledge sharing quality relationship, i.e., $\beta = 0.568$, $p < 0.05$. On the other hand, when the female gender was introduced as a moderator in the Figure 1 model, a negative relationship transpired between the social capital theory and knowledge sharing quality relationship, i.e., $\beta = 0.506$, $p < 0.05$. This concludes that the main problem lies with the findings of the female gender. This could indicate that women do not accept the theory of social capital and the sharing of knowledge as men.

This study is of the effect of positive emotions in a higher education institution context. As per the results of the data analysis, five hypotheses (H1, H2, H3, H4 and H5) were reported as supported hypotheses, of this study. The findings of this study encourage the notion that students' social capital facilitates their sharing of quality knowledge during e-learning. Such a phenomenon demonstrates the vitality of the knowledge sharing behaviour for teaching and learning; for both students and instructors. When investigating further into the three dimensions of the social capital theory (structural, relational and cognitive dimension), the empirical findings revealed that Hypotheses 1 was supported due to three sub-hypotheses (H1a, H1b and H1c), indicating that students social ties (structural dimension), trust and norms of reciprocity (relational dimension) and a common vision of the group that is virtually participating, are fundamental for interactions like quality knowledge sharing to occur within virtual environments. As per the view of the author of this study, since students are assigned teamwork or group projects, such a group reflects ties between collaborators who need to accomplish a task/assignment, and students are furnished marks for team work in group assignments. Hence, team project, if introduced in e-learning environments, can host interactions during e-learning processes, i.e., once mandated by instructors who can positively reinforce by rewarding students with marks for sharing quality knowledge as they virtual interact to accomplish online assignments. In addition, since trust and norms of reciprocity also facilitate knowledge sharing. Trust is vital for students to excel in their learning outcomes, and it is trust that is the backbone for instructors to effectively teach students (Zelihic, 2015) while reciprocity is essential for cooperation within group learning and performing collaboratively to accomplish a task/assignment. A cooperating is especially possible if the group members have had a positive experience working together in the past (Biele et al., 2008). For the instructors it harvests beliefs and values

of how a class a taught and this is a driver for community for teaching quality during the class. Though seeming straight forward, such a rationale seems to express 'a few shades of' disagreements between instructors who are disunited in their methods of teaching during class (Fountas and Pinnell, 2018).

Similarly, positive emotions presented positive relationship between social capital theory and knowledge sharing, which shows that social capital theory and knowledge sharing quality foster positive emotions. On the other hand, when gender was presented to analyse the result on social capital theory and knowledge sharing quality, it displayed a negative relationship. When further tests were conducted, they indicated that the males they do not believe in sharing knowledge so to bank the social capital of resources within e-learning virtual environment. Future research should qualitatively investigate why such is the case for males but not for females. This study faced few limitations in its path. Social capital theory, knowledge sharing quality and positive emotions are constructs that were assessed thru a survey where the target population was self-reporting. Future research could apply a qualitative method to understand the knowledge contributions of this study in more detail. Another limitation could be the fact that all students used Moodle alone for e-learning. Future research could use other virtual platforms, so to compare results between differing platforms, e.g., future research could also assess social media platforms such as Facebook and compare them with Moodle like pure e-learning platforms. Finally, future research could also test this study's model on other sample groups, particularly instructors as well as students of other majors, and from other academic institution, as well as understand how this model is applicable in other service sectors like the banking sector. For instance, banking customers shy from using the internet services of banks for their concerns, doubt, and hesitations quite similar to those explained in this study; to attract, satisfy, and retain end users (Agolla et al., 2018; Ansari, 2018). Hence, this model could shed light as to why universally technology shy away its end users, and how such human computer interactions can be mitigated.

While the fact that all hypotheses were supported, this study contributes theoretical implications for the higher education sector, who can be confident in designing their curricula based on social capital led sharing of quality knowledge, and focus more on motivating male by making females role models, for encouraging interactions during e-learning. Fact that positive emotions moderate to improve the relationship between social capital theory and sharing of quality knowledge; goes to show how important positive attitude plays a fundamental role for motivating and sustaining knowledge sharing behaviour within virtual environments, so students continue excelling in their learning processes. Thus, there are practical implications from this study, pertaining to involving sharing of quality knowledge in virtual environments thru those dimension of social capital theory that prove empirically vial for facilitating the knowledge sharing behaviour, i.e., social interaction ties, trust, norms of reciprocity an shared vision. As a result, when instructors design curricula that blend face-to-face classrooms with e-leaning teaching and learning sessions, group projects can be integrated with in-class focus group-based discussions, so that while students interact with their peers in instructor supervised classrooms, their interactions will spur the sense of trust and reciprocity amongst the peers, such that during class they common visions to achieve a learning goals goal/s will encourage them to take such a drive out of such classrooms, and start indulging within e-learning environments to continue interact to learn, so to reach their learning outcomes.

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