

Knowledge Sharing Self-Efficacy, Motivation and Sense of Community as Predictors of Knowledge Receiving and Giving Behaviors

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ABSTRACT

This study examines the extent to which knowledge sharing self-efficacy, motivation and sense of community variables predict undergraduate students' knowledge sharing behaviors (knowledge receiving and knowledge giving) in online learning environments. The participants included undergraduate students ($N = 284$) from two different universities in Turkey. Stepwise multiple regression analyses were carried out to identify the variables predicting knowledge sharing behaviors as knowledge giving and receiving behaviors. The results revealed that both knowledge giving and receiving behaviors were best predicted by knowledge sharing self-efficacy, followed by motivations and sense of community. External effects and growth of aim affected knowledge receiving, whereas only internal effects affected knowledge giving. The independence factor has a negative effect on knowledge receiving, yet has a positive effect on knowledge giving.

Keywords

Knowledge sharing, Knowledge receiving-giving, Self-efficacy, Motivation, Sense of community

Introduction

Information presents both complex and connected features. It can be freely disseminated within a community when appropriate conditions are provided. Knowledge sharing is a kind of exchange behavior that is performed consciously between two or more individuals (Bock, Zmud, Kim & Lee, 2005). Knowledge sharing refers to receiving knowledge from the source or giving knowledge to the source. The foundation of knowledge sharing is knowledge creation: the production of knowledge by the receiver. In this sense, knowledge sharing is an important process for the acquisition of knowledge and supporting people's learning processes, creating new ideas through socialization, and developing new opportunities. It can be defined as activities that help people work together, facilitate knowledge changes, enhance organizational learning capacities, and raise people's skills in achieving individual and organizational aims (Dyer & Nobeoka, 2000). The knowledge sharing process facilitates the creation of the relevant sense between the source, who can effectively convey what s/he knows, and the receiver, and ensures the development of a solution.

Online learning has grown significantly over the past few years. Students' participation and interaction have become important in online learning environments. According to Avcı Yücel and Usluel (2016), improvements in students in terms of knowledge building and sharing processes may be seen in the students' interaction and participation. The success of online learning environments depends on the knowledge sharing process (Ma & Yuen, 2011). Knowledge is internalized when knowledge is created and shared through online learning environments. Knowledge sharing is the main activity that encourages people and increases their motivation to contribute in online learning environments. Individuals can respond to a problem in online learning environments through sharing their knowledge. Nevertheless, knowledge sharing is a complex and time consuming process. Therefore, it is important to understand how to create and organize knowledge before sharing. It may be problematic because of the human related or technical related factors. Some participants experience difficulty in this process due to other individuals within the community. There are certain reasons leading people not to share knowledge: not knowing why knowledge sharing is necessary; what you need to do to share knowledge and how to share knowledge, also; believing that there are more important things than knowledge sharing (Shaari, Abdul Rahman & Rajab, 2014). Moreover, knowledge sharing frequency can be considered as the main problem encountered in online knowledge sharing process (Lin, Hung, & Chen, 2009). Hence, there are many factors playing an important role in an individual's willingness to share knowledge, such as the requisite information and communication technologies, organizational and technical infrastructure, benefits, trust, extrinsic and intrinsic motivation, performance expectation, self-efficacy, and sense of community (Ardichvili, Page & Wentling, 2003; Sharratt & Usoro, 2003; Bock et al., 2005; Tamjidyamcholo, Bin Baba & Tamjid, 2013; Tseng & Kuo, 2014). Therefore, it is necessary to study how people's awareness of sharing

knowledge can be raised and identifying the source of this problem seems important for the development of the learning process.

When the literature is reviewed, it is seen that some studies have examined the relationship between knowledge sharing behaviors (KSB) and certain variables such as motivation, sense of community, attitude and self-efficacy perceptions (Chen, Chen & Kinshuk, 2009; Chen & Hung, 2010; Chen, 2011; Yang & Lai, 2011; Liao, To, & Hsu, 2013; Tseng & Kuo, 2014; Lai & Chen, 2014; Hau & Kang, 2016; Yılmaz, 2016). However, very few of these studies examined KSB in terms of the two categories of knowledge receiving behavior (KRB) and knowledge giving behavior (KGB) (Chen & Hung, 2010; Tseng & Kuo, 2014). Moreover, most of these studies were carried out within organizational settings, in company or management sectors or in communities of professional development. Kwahk and Park's (2016) studied employees and they found that knowledge self-efficacy (KSE), and social interaction ties positively influence knowledge-sharing activities in social media contexts. A further study by Wang and Hou (2015) related the influence of various types of motivations to employees' KSB; it was seen that intrinsic/soft rewards (e.g., personal reputation) and extrinsic/hard rewards (e.g., reciprocity, financial rewards/benefits) are significant influencing factors in KSB. Hau and Kang (2016) studied users' innovation-related knowledge sharing in online user communities. They found that users' lead user status has a positive relationship with their innovation-related knowledge sharing in an online user community. Self-efficacy and controllability of online community systems affect perceived behavioral control, and thus affect innovation-related knowledge sharing. Henttonen, Kianto and Ritala (2016) study was based on a public organization, and found that knowledge-sharing propensity (attitude, benefits and self-efficacy) leads to knowledge-sharing behavior, and this behavior leads to improved individual job performance. The studies in the literature mostly used forums, blogs, wikis and social environments as the virtual communities for examining knowledge sharing and its features. Eid and Al-Jabri (2016) aimed to examine the impact of ways of using social networking sites (SNS) (such as chatting and online discussion, creating knowledge and information content, file sharing, and enjoyment and entertainment) on knowledge sharing and learning among tertiary students. The results showed that there are significant positive relationships between both chatting and online discussion and file sharing and knowledge sharing, as well as entertainment and enjoyment, with student learning. Additionally, certain studies in the literature investigated the teachers' behaviors (Chen, 2011; Tseng & Kuo, 2014).

Nowadays, the use of online learning environments has been spreading rapidly and the number of university students who use these environments is increasing. In this study, KSB is divided into two categories: KRB and KGB, and is applied to those undergraduate students who have experience in using online learning environments. As noted, KSB has been regarded as being only one category in previous studies conducted with undergraduate students who are participated in virtual learning environments (Yılmaz, 2016). It is, however, necessary to examine knowledge giving and knowledge receiving separately, as they are significantly different from each other. Thus, it will be possible to better explain KSB and get more insights into KSB.

The purpose of study was to investigate the KSE, motivation and sense of community variables influencing the prediction of KSB which affect the interaction, participation and learning in online learning environments. In this context, the research question for this study is: "To what extent is undergraduate students' KSB predicted by their KSE, motivation and sense of community?"

Knowledge Sharing Behavior (KSB)

KSB is defined as a behavior displayed by group members in online learning environments for receiving and giving resources, knowledge, experience, or emotional support to/from other members (Bock & Kim, 2002; Ridings, Gefen & Arinze, 2002; Wasko & Faraj, 2000, 2005; Tseng, & Kuo, 2014). KSB emerges with the expectation of external rewards and reciprocal relations (Bock et al., 2005). Knowledge sharing is steady and smooth when group members believe that sharing yields a reciprocal benefit, or the maintenance of reciprocal relations contributes to their work. Group members are generally interested in knowledge sharing to acquire new information, access more useful sources, increase interpersonal communication, enhance both working performance and problem-solving skills, and support professional skills (Tseng & Kuo, 2014). Group members particularly expect to benefit from the sharing process (Watson & Hewett, 2006).

Knowledge sharing activities are divided into two categories (Ridings et al., 2002; Tseng & Kuo, 2014): knowledge receiving and knowledge giving. Knowledge receiving, in its simplest definition, refers to reading message threads and conversations in an online environment. In addition, knowledge is actively demanded by the sending of questions and suggestions. On the other hand, knowledge giving in an online environment involves initiating a new subject, sending a message, responding to another person's message directly, or just

sending comments. Therefore, knowledge giving mostly involves active participation and exposure. In this regard, this study deals with these two different but associated modes within the scope of KSB.

Knowledge Sharing Self-Efficacy (KSE)

People's perceptions of their own skills regarding the ability to complete complex tasks are referred to as self-efficacy (Bandura, 1982). Self-efficacy is one of the key factors affecting people's expectations in relation to the future flow and possible outcomes of a transaction. It is an individual's belief in his/her own skills which affects the strategies adopted by him/her to achieve certain aims. It is a kind of self-evaluation of decisions regarding our behaviors, the extent of our efforts, and our determination in the face of obstacles (Hsu, Ju, Yen, & Chang, 2007). Self-efficacy belief therefore plays an important role in motivation and behaviors (Bandura, 1997). Researchers stated that KSE also influences individuals' knowledge sharing decisions in virtual and online learning environments and organizations (Bock et al., 2005; Hsu et al., 2007; Kankanhalli, Tan & Wei, 2005). KSE refers to a person's belief in his/her own skills to be able to share knowledge in either online or face-to-face environments. In addition, KSE is also known as a behavioral control variable that helps people overcome the problems they encounter regarding knowledge exchange in virtual environments (Hsu et al., 2007).

In addition to the willingness to share knowledge, we need to have positive perceptions regarding our skills in creating knowledge. The possibility of open exhibition of a specific behavior by a person with high self-efficacy is higher in comparison to the possibility of exhibition of such behavior by a person with lower self-efficacy. Basically, high-level KSE may improve interpersonal collaboration, reduce "free-riding (taking without giving)" behaviors, and increase the participants' knowledge contribution. The literature indicates that self-efficacy regarding a particular field influences a person's attitudes and behaviors regarding said field. Recently, studies have been conducted on whether people's self-efficacy have an effect on knowledge sharing (Tamjidyamcholo, Bin Baba & Tamjid, 2013; Shaari et al., 2014; Van Acker, Vermeulen, Kreijns, Lutgerink & Van Buuren, 2014). When people believe that they are either not connected to the subject, it is not important, or there is a lack of time, they might refrain from receiving or giving knowledge.

Motivation

Motivation can be defined as an internal force determining the direction of the motivating act and rousing the appropriate behavior (Mohd, Goh & Fathi, 2012). Researchers explain the role of motivation as directing behaviors, setting an aim, allowing the continuation of, as well as leading to a preference for a specific behavior, increasing the performance of learning, and the amount of work an individual completes (Mohd et al., 2012; Rehman & Haider, 2013). Motivation involves any behavior directed towards an aim (Morgan, 1984). Therefore, individuals believe that they will succeed by actively participating in the activities that require effort for learning. It is in this way that they acquire motivation. By this means, they spend their time and energy to achieve the aims whose criteria are specified by them (Ülgen, 1994).

In the previous studies, the importance of examining motivational factors was investigated in various contexts and it was recognized that they either facilitate or restrain KSB (Kankanhalli et al., 2005; Cruz, Perez, & Cantero, 2009; Chang & Chuang, 2011; Bălău & Utz, 2016; Silic & Back, 2017). In this context, understanding people's motivation in the knowledge sharing process is important. Thus, we can understand people's personal knowledge sharing processes and why they are or are not willing to share (Endres, Endres, Chowdhury & Alam, 2007). Individual motivation attributes a critical importance to facilitate or prevent knowledge sharing, and it is possible to say that it can affect individual processes in acquiring knowledge (Sondergaard, Kerr & Clegg, 2007). Hence, the solutions to many problems require improving internal and external motivation (Yang, 2004). Internal motivation involves pleasure and satisfaction resulting from performing a behavior (Deci & Ryan, 1987), while external motivation emphasizes a behavior carried out to achieve certain aims/rewards (Vellerand, 1997). Internal and external motivation may affect not only personal intentions regarding an activity, but also the real behaviors.

The role of motivation has been recognized and emphasized in the knowledge sharing literature (e.g., Davenport & Prusak, 1998; Goodman & Darr, 1998; Hansen, Mors, & Lovas, 2005). In addition, it is stated in the literature that there is a reciprocal relationship between KSB and motivation (Majid & Yueng, 2007; Cheng & Ku, 2009).

Sense of community

A learning community is a group of people supporting each other in a learning environment (Wilson & Ryder, 1998). In addition, such a group has to be integrated in terms of knowledge acquisition, creation, and transmission in order to be a learning community (McCalla, 2000). The term learning community refers to an area in which people define the problems influencing them, produce and implement solutions, and learn via group activities. The literature suggests that sense of community has an important influence on online learning environments, perceiving the social environment, and the students' learning performances (Kreijns, Kirschner, Jochems & Buuren, 2007; Abedin, Daneshgar & D'Ambra, 2011). This indicates that sense of community may be associated with the variables related to learning. Therefore, it is believed that sense of community and KSB, which play important roles in the learning process, are associated with one another.

Sense of community is the degree to which a person feels the sense of belonging to a certain group (Yoo, Suh & Lee, 2002). It is the sense of belonging felt by the group members; the idea that group members are important for each other, and; the common shared belief needed by the members (McMillan & Chavis, 1986). It leads to the presentation of knowledge owned and maintained by the learning community through a common perspective for the benefit of community (Wasko & Faraj, 2000). Hence, the knowledge sharing process results in internal motivation rather than members being motivated by external factors. KSB helps community members to improve their sense of being part of the community. Certain studies indicate that sense of community may increase the possibility of community members participating in online environments and making contributions to these environments (Hars & Ou, 2002; Yoo et al., 2002). In this regard, a strong sense of community justifies its importance in the knowledge sharing process (Sharratt & Usoro, 2003).

Research objective

The knowledge sharing process is very important for the success of online learning environments (Ma & Yuen, 2011). Nevertheless, some participants experience difficulty in working through this process with other individuals within the community. Knowledge sharing is a complex and time-consuming process, because it is important to understand how to create and organize knowledge before sharing. Knowledge sharing may be problematic because of human-related or technical-related factors. Knowing the source of this problem seems important for the development of the learning process. In this sense, it is believed that it is important to investigate the variables that affect KSB from an explanatory point of view.

The main problem is in encouraging individuals to share knowledge: to increase their willingness and frequency to share knowledge in online learning environments where knowledge sharing is principle. Students' behaviors in the process of sharing knowledge can only be encouraged and facilitated. For this reason, in this process there is a need for studies to determine the factors at a personal level that encourage or restrain the students' KSB. While there is a lot of research on knowledge sharing in different areas, research specifically relating to this notion in an online learning community is quite limited.

Nonetheless, there has been an increasing interest in exploring the factors that facilitate or hinder individuals' KSB in the virtual communities. Wang and Noe (2010) presented a framework of KSB, including environmental factors (organizational context, interpersonal and team characteristics, cultural characteristics), individual characteristics and motivational factors. According to this framework, new future research is needed on topics concerning individual characteristics and motivational factors.

The aim of this study is to investigate the KSE, motivation and sense of community variables influencing the prediction of KSB which affect the interaction, participation and learning in online learning environments. In this context, the research question for this study is: "To what extent undergraduate is students' KSB (knowledge giving, knowledge receiving) predicted by their KSE, motivation (external effects, internal effects, growth of aim, self-conscious) and sense of community (concordance, independence, similarity)?"

Methodology

Correlational research design was used in this study; this shows the linear relationship between two or more variables (Creswell, 2008). According to Creswell (2008), it involves an assessment of the degree of relationship between two or more variables: a procedure in which subjects' scores on two variables are simply measured, without manipulation of any variables, to determine whether there is a relationship.

Participants

Data were collected from the 313 undergraduates' students in two different universities, at Ankara and Karabük, in Turkey. However, after the initial statistical analysis, 29 students' data were removed and the analyzes were thus carried out with 284 participants. 73% ($N = 208$) of the participants were female, whereas 27% ($N = 76$) were male. The mean age of all participants was 20.5 years ($SD = 1.99$). The participants' other characteristics are displayed in Table 1. Participation was on a voluntary basis and no financial incentive was offered.

Table 1. The participants' characteristics

Demographic characteristic		<i>N</i>	%
Gender	Male	76	26.8
	Female	208	73.2
Age	Younger ≤ 20	160	49.7
	Older > 20	124	50.3
Education Level	Faculty of Education	220	77.5
	Vocational School	64	22.5

Measurement instruments

Data were collected through online instruments. The instruments used in this study are given below.

Motivation

The instrument measuring motivation was developed by Semerci (2010). The original instrument comprised 35 items with 4 factors on a 5-point Likert scale. The reliability and validity of the scale was carried out by Semerci (2010) with 300 participants. For structural validity, explanatory factor analysis was performed and the factorizing method was principal components analysis, and the spinning method was Varimax. The results showed that the scale consisted of four sub-scales which were external effects, internal effects, growth of aim and self-consciousness. The total variance was 37.91%. For the reliability of the scale, item-total correlation and Cronbach's alpha coefficient of internal consistency were carried out. Item-total correlations were found to range between 0.36 and 0.58 ($p < .001$). Correlation coefficient between two half points was 0.895 ($p < .01$). Cronbach Alpha Coefficient of scale was 0.896. The Cronbach's alpha value for this study was .94. Certain scale items are given below as an example.

- I like to learn new knowledge while preparing my homework.
- I ask questions to learn new knowledge in my lessons.
- I like helping my friends about the course topics.

Sense of community

In order to measure sense of community, an instrument developed by Gökçearsan (2013) was used. The original instrument comprised 28 items with 3 factors on a 4-point Likert scale. The reliability and validity of the scale was carried out by Gökçearsan (2013) with 245 participants who had participated in online learning environments previously. Explanatory and confirmatory factor analysis was employed for the structural validity of the scale. The results of the exploratory factor analyses revealed that the scale consisted of three sub-scales: concordance, independence and similarity. The total variance was 42.65%. The confirmatory factor analysis indicated that the scale model was theoretically and statistically appropriate. Cronbach's alpha coefficient of internal consistency was found to be 0.88 for all factors in this study, as with original instrument. Certain scale items are given below as an example.

- I hesitate to ask questions to the members of the online learning community.
- Participation in the online learning community increases my confidence about participating in course discussions.

Knowledge Sharing Self-efficacy (KSE)

KSE, as an instrument, was originally developed by Tseng and Kuo (2014). It is composed of 8 items on a percentage scale, ranging in 10-unit intervals from 0% (not at all confident) to 100% (totally confident). The researchers performed confirmatory factor analysis: the factor loading was between 0.8 and 0.88 as a single factor. Cronbach Alpha internal consistency coefficient was .93 for the whole scale (Tseng and Kuo, 2014). The scale was adapted into Turkish by Ergün and Avcı Yücel (2015). The reliability and validity of the scale was confirmed with 255 participants for adaptation. Exploratory factor analysis was employed, the factorizing method was principal components analysis and the spinning method was Varimax. The results of the analyses showed a single factor solution as original scale, and the factor loading was between .48 and .75 for each item of the scale. The total variance of the scale was 66.23%. Cronbach's Alpha internal consistency coefficient was .93 for the whole scale for this study, as with original scale. The results showed that it was a valid and reliable measurement tool for this research. Certain scale items are given below as examples.

- I have confidence in sharing my teaching resources with other members.
- I have confidence in expressing my emotions with other members.

Knowledge Sharing Behavior (KSB)

The KSB scale was developed by Tseng and Kuo (2014). It was modified to measure the behavior in which members give and receive resources, knowledge, experience, or emotional support with other members in the online community of practice. Tseng and Kuo (2014) performed confirmatory factor analysis with two factors: KGB (the factor loading was between 0.83 and 0.92) and KRB (the factor loading was between 0.77 and 0.88). Cronbach Alpha internal consistency coefficient was respectively .95 and .91 (Tseng and Kuo, 2014). Turkish adaptation study was conducted by Avcı Yücel and Ergün (2015). It is composed of 9 items on a 7-point Likert scale, with a score of 1 indicating "strongly disagree" and 7 "strongly agree." Both exploratory factor analysis and confirmatory factor analysis were conducted. Exploratory factor analysis was employed, the factorizing method was principal components analysis and the spinning method was Varimax. The scale consisted of two factors, as in the original scale. The total variance of the scale was 71.91%. The results of confirmatory factor analysis showed it to be a good fit. The scale of internal consistency coefficient was between .90 and .87, and item-total correlation co-efficiencies varied between .587 and .751. The Cronbach alpha for each subscale was .80 for knowledge receiving, .84 for knowledge giving and .90 for the whole scale. Cronbach Alpha internal consistency coefficient was .85 for the whole scale for this study. Some of the scale items are given below as examples.

- I obtain other members' teaching experience, knowledge or skill in online environments.
- I read other members' posted sharing in online environments
- I often respond to the topics discussed in online environments.
- I often contribute my teaching experience, knowledge or skill in online environments.

Data analysis

Prior to data analysis, multiple regression analysis assumptions were examined. The sample size ($N = 313$) was found to be adequate for analysis. However, some missing data were found for each variable; twelve of them were therefore removed. Skewness-kurtosis coefficients were calculated for each observation. Data were removed from six observations because they were found to be greater than 1. Data from a further four observations were excluded after using z statistics and box graphics for univariate extreme value analysis. For multivariate outliers, Mahalanobis distance measure was used. Seven observations displaying multivariate outliers were also eliminated from the data set.

After examining the suitability of the data, analysis was performed with 284 data. On the issue of multicollinearity, the variables under study, starting with the correlation matrix for all variables, were checked. Multicollinearity becomes a serious problem when the coefficient is higher than 0.90 (Tabachnick & Fidell, 2001). In this study, the highest correlation coefficient was 0.477. The Variance Inflation Factor (VIF) values ranged from 1.23 to 2.26. Hair, Anderson, Tatham and William (1998) suggest that a VIF of less than 10 is indicative of inconsequential collinearity. These results show that there was no multicollinearity for this study and multiple regression analysis could be used.

To explore if a common method bias exists due to the method of data collection based on the self-report questionnaire, we performed Harman's single-factor test (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). The result showed that there were multiple factors, which eigenvalues were greater than 1, the total variance was 67%. The first factor explained by one factor is 23% of the total variance. Therefore, common method bias was not a problem for this study, because the single factor wasn't the cause of most of the total variance. SPSS 16.0 software was used for the statistical analysis. Pearson product-moment correlation and stepwise regression were used.

Results

In this research, motivation, sense of community, knowledge sharing attitude, KSE and KSB data has been gathered from students. According to the responses obtained from students, descriptive statistics are presented in Table 2 below.

As shown in Table 2, students had a high level of motivation related to external effects ($M = 141.01$, $SS = 18.40$), while internal effects ($M = 34.65$, $SS = 5.98$), self-conscious ($M = 26.80$, $SS = 4.79$) and growth of aim ($M = 27.78$, $SS = 4.24$) were at medium levels. The results indicated that students' perceptions of concordance ($M = 42.28$, $SS = 6.78$), independence ($M = 25.81$, $SS = 7.26$) and similarity ($M = 8.39$, $SS = 1.85$) values were close to each other's. The level of students' KRB ($M = 20.81$, $SS = 4.58$), is more than KGB ($M = 19.32$, $SS = 6.83$).

Table 2. Descriptive statistics

Scale		Number of items	<i>N</i>	Min	Max	Mean	<i>SS</i>	Skewness	Kurtosis
Motivation	External effects	12	284	75	175	141.01	18.40	-.989	.971
	Internal effects	9	284	12	45	34.65	5.98	-.532	.634
	Growth of aim	7	284	12	35	27.78	4.24	-.558	.197
	Self-conscious	7	284	8	35	26.80	4.79	-.397	.519
Sense of community	Concordance	14	284	15	56	42.28	6.78	-.414	1.003
	Independence	11	284	11	44	25.81	7.26	.298	-.189
	Similarity	3	284	3	12	8.39	1.85	-.436	.857
KSB	KGB	4	284	5	35	19.32	6.83	.091	-.593
	KRB	5	284	8	28	20.81	4.58	-.185	-.562
KSE	-	8	284	8	80	48.48	16.96	-.164	-.757

The Pearson correlation coefficients were calculated to examine the relationships between students' KSB and motivation, sense of community and KSE (Table 3). The results indicated that KRB showed the highest positive relationship between KSE ($r = .539$, $p < .05$). Similarly, there were positive correlations between KGB and other scales, showing the highest positive relationship with KSE ($r = .677$, $p < .05$). Stepwise multiple regression analysis was performed to identify to what extent students' KSE, sense of community and motivation predict the students' KSB.

Table 3. Correlations between variables

	Motivation			Sense of Community			KSE
	External effects	Internal effects	Growth of aim	Self-conscious	Concordance	Independence	
KRB	.531	.411	.433	.378	.328	-.240	.030
	.000	.000	.000	.000	.000	.000	.610
KGB	.212	.385	.302	.320	.366	.024	.193
	.000	.000	.000	.000	.000	.683	.001

Predicting knowledge receiving behaviors

Stepwise multiple regression analysis was carried out to obtain those variables predicting the KRB of the students. The results of the stepwise regression analysis were displayed as four models (Table 4). In the first model, KSE explains 32.8 % of the total variance in KRB. The contributions of external effects in Model 2 are 16%, independence in Model 3 is 1.5% and growth of aim in Model 4 is approximately 1%. Total variance of the four variables is 47%. KSE was the most effective independent variable in predicting the KRB. Regression coefficients of each variable within the KRB show that along with the increase in the levels of student KSE (β

=.402, $p < .05$), external effects ($\beta = .320$, $p < .05$) and growth of aim ($\beta = .121$, $p < .05$). Conversely, the higher independence ($\beta = -.141$, $p < .05$) gets, the lower the levels of KRB.

Table 4. Summary of stepwise regression analysis predicting KRB ($N = 284$)

Model	Variable	R	R^2	Adjusted R^2	Standard error	β	t
1	(Constant)	.539	.290	.288	3.867		
	K_selfefficacy					.539	10.745
2	(Constant)	.670	.449	.445	3.413		
	K_selfefficacy					.425	9.224
	External Effects					.414	8.999
3	(Constant)	.681	.464	.459	3.372		
	K_selfefficacy					.419	9.210
	External Effects					.392	8.475
	Independence					-.126	-2.817
4	(Constant)	.688	.473	.466	3.350		
	K_selfefficacy					.402	8.740
	External Effects					.320	5.658
	Independence					-.141	-3.149
	Growth of aim					.121	2.163

Predicting knowledge giving behaviors

Stepwise multiple regression analysis was carried out to obtain the variables predicting the KGB of students. The results are shown in Table 5 below.

Table 5. Summary of stepwise regression analysis predicting KGB ($N = 284$)

Model	Variable	R	R^2	Adjusted R^2	Standard error	β	t
1	(Constant)	.677	.458	.456	5.040		
	K_selfefficacy					.677	15.429
2	(Constant)	.703	.495	.491	4.873		
	K_selfefficacy					.617	13.887
	Internal effects					.201	4.536
3	(Constant)	.709	.502	.497	4.846		
	K_selfefficacy					.625	14.095
	Internal effects					.201	4.551
	Independence					.087	2.056

Table 5 presents the results of the analysis, displayed in three models. Students' KGB is mostly associated with KSE and this itself explains the variation of 45% in the first model. Internal effects in Model 2 are described as 4% and independence in Model 3 as 1%. Total variance of the three variables is 50%. KSE was the most effective independent variable that also predicted the KGB. Regression coefficients calculated regarding KGB indicate an increase in students' KSE ($\beta = .625$, $p < .05$), internal effects ($\beta = .201$, $p < .05$) and independence ($\beta = .087$, $p < .05$) that correspond to an increase in the KGB.

Discussion and conclusions

This study investigated to what extent students' self-efficacy, motivation, and sense of community predict their KSB. Knowledge sharing takes time and effort, and is a challenging task requiring learners to be willing to interact with one another (Ghadirian, MohdAyub, Silong, Abu Bakar & HosseinZadeh, 2014; Van Acker et al., 2014). In this study, knowledge sharing is consisted of two factors: knowledge receiving and knowledge giving. It has been seen that both knowledge receiving and knowledge giving have the strongest relationship with KSE. The best predictor of both factors is KSE. This result is consistent with the results of the previous studies in the literature. Bock and Kim (2002) stated that self-efficacy is an important factor affecting internal motivation, which is necessary for the sharing of knowledge. Hsu et al. (2007) examined the relationships between KSB and variables such as self-efficacy, trust, and outcome expectations. Furthermore, Yılmaz (2016) stated that students' self-efficacy perceptions of their technical skills affect KSB positively. They found that self-efficacy has both direct and indirect effects on KSB. According to the researchers, this shows that self-efficacy plays an important role in directing people's behaviors. Self-efficacy also plays an important role in one's fulfilling a behavior

consciously (Bandura, 1982); in addition, it has an important place in the knowledge sharing process. Undergraduate students with high self-efficacy have greater trust in themselves regarding their skills and abilities, which leads to a high level of motivation. Such students maintain their actions and activities of knowledge sharing with more enthusiasm and use their own cognitive resources to carry out their tasks successfully (Bandura, 1997). They also make use of other people's cognitive resources for learning. Therefore, it is possible to say that undergraduate students with high levels of KSE tend to be active in both KRB and KGB in online environments.

The study results indicate that self-efficacy alone cannot predict KSB. KSE, along with the factors of internal effects and independence, predicts 50% of KGB. Accordingly, as KSE, internal effects, and independence increase, KGB rises as well. It has been found that KSE, external effects, independence, and growth of aim predict 47% of KRB. Accordingly, as undergraduate students' KSE, external effects, independence, and growth aim increase, their KRB rises as well.

Knowledge sharing is important because it can increase learning capacity through knowledge exchange in a community, which in turn creates awareness (Dyer & Nobeoka, 2000). Therefore, it is important in supporting the development of the learning process. Learning refers to gains obtained through the interaction and participation established between learners. These interactions can take place via participation in online learning environments (i.e., receiving and giving knowledge). One of the main problems in online learning is encouraging learners to share their knowledge. One of the factors directing people to make a move for a certain purpose is motivation. Motivation refers to those methods that attribute efforts, direction, or purpose to the requisite behaviors, and plays an important role in the knowledge sharing process (Hansen et al., 2005; Ma & Yuan, 2010; Apandi, Omar, & Abdullah, 2015). While the role and the importance of motivation is emphasized in the knowledge sharing literature, there are nonetheless other studies with results indicating that there is no relationship between external motivation and knowledge sharing (Kwok & Gao, 2005; Lin, 2007). The results of the current study are indicative of the fact that motivation is crucial in the knowledge sharing process. External effects and growth of aim, which are key motivation factors, were seen to have an effect on knowledge receiving, while only internal effects were seen to have an effect on knowledge giving. Growth of aim, which is a clear effect on knowledge receiving, is associated with the development of a vision. Propositions such as wanting to get high scores, wanting to be one of the first placed students, and studying specifically to get high scores from the exams are predictors of growth of aim. For instance, such people aim to get high scores by receiving knowledge from their environment. Thus, they need the knowledge and experiences in the environment, which leads them to have tendency to receive knowledge. External effects refer to behaviors exhibited to achieve certain aims. Therefore, it is possible to say that students read message threads in online environments so as to achieve certain aims and demand knowledge by either asking questions or making suggestions; these actions motivate them. People with high external effects care about what other people say. Hence, they may be in need of the knowledge or support provided by other people. In the knowledge giving process, students need to be motivated by internal effects (i.e., the idea that their behaviors will be useful). Apandi et al. (2015) state that people who are internally motivated participate in the knowledge sharing process more and avoid free-riding behaviors. Contributing to ongoing message threads in online environments, sending messages to initiate a new subject, or responding to incoming messages can be considered to be a part of the internal effects process. In this sense, it is of note that external effects tend to influence knowledge receiving while internal effects affect knowledge giving.

The independence factor predicts both knowledge receiving and giving. This is a factor involving situations in which individuals feel uncomfortable in online learning environments, do not trust other members, and they believe that the environment will not contribute to their improvement in any way. The independence factor negatively affects knowledge receiving, yet positively affects knowledge giving. As the students' independence factor increases, so does knowledge receiving. As a matter of fact, it is stated in the literature that failure to meet the expectation of trust in the knowledge sharing process (i.e., receiving and giving knowledge) negatively affects knowledge sharing (Mayer & Davis, 1999). Thus, it is possible to say that when students do not trust the cognitive sources of other people in online learning environments and believe that the knowledge they will receive will not improve them, they tend not to receive knowledge in the environment. This is quite contrary to knowledge giving. As the KGB increases, the independence factor increases as well. However, this effect is less than 1%. Students with a high independence factor tend to give knowledge in knowledge sharing environments, even if they do not trust others. This may indicate that students with high self-efficacy regarding the usefulness of their knowledge tend to share their knowledge, which they believe to be correct, in the environment. It is also possible, however, that such students give knowledge to increase their prestige or reputation in the environment, even when they do not trust such environments. As a matter of fact, there are studies in the literature asserting that reputation does indeed affect knowledge sharing (Wang & Noe, 2010; Chang & Chuang, 2011). Wang and

Noe (2010) state that perceived benefits (i.e., taking actions with the expectations of respect, prestige, and tangible incentives) is one of the most studied antecedents of knowledge sharing. One of the basic factors enhancing KSB in learning environments is reputation, which is the basic perceived usefulness. Establishing a reputation and enhancing status are therefore important factors stimulating participants to provide content by responding more frequently and more intelligently (Chang & Chuang, 2011).

This study concludes that KRB and KGB display different characteristics from one another. Knowledge giving mostly involves active participation and exposure, because it requires students' own knowledge sharing with others in online environments. However, it is also necessary to receive knowledge in order to give knowledge. Therefore, this knowledge exchange is the key trigger in the sharing process. Especially, interaction and participation between the students in different environments is important for the realization of learning. For this reason, students are expected to be either actively or passively involved in the interaction and participation process. Particularly in the formation of meta-cognitive knowledge, it is important for students to participate in the process of knowledge building and sharing. "In the knowledge building process, students are expected to reflect their meta-cognitive opinions. Such reflection is difficult and requires synthesis, but improves the knowledge building process by providing more creative and learning supportive content" (Avcı Yücel & Usluel, 2016, p. 45). Thus, participation and interaction in online environments can serve to reduce feelings of disconnection and isolation (Duncan-Howell, 2010), support new knowledge building and creation (Avcı Yücel & Usluel, 2016; Wang, Yang, & Chou, 2008) and thus facilitate the knowledge sharing process.

Online learning environments have faced a number of challenges, such as technical difficulties (Jaggars, 2014), lack of understanding as to how to effectively share knowledge, lack of social networking skills, inability to use modern technology, communication barrier skills, lack of time, lack of incentives or rewards for knowledge sharing, the appropriate organization of knowledge before sharing, and the adequate frequency of knowledge sharing (Lin et al., 2009; Shaari et al., 2014; Awodoyin, Osisanwo, Adetoro & Adeyemo, 2016). Among the most difficult challenges faced by online environments is fostering and sustaining knowledge sharing (Hsu et al., 2007; Lin et al., 2009). Nonetheless, the exchange of knowledge is gaining importance, especially in ensuring sustainability in online environments. Therefore, the results of this study should grow in importance in terms of showing the factors affecting the knowledge sharing process.

The results of this study indicate that KSE, motivation, and sense of community have significant influence on knowledge sharing. Numerous studies indicate that dispositional variables such as motivation and self-efficacy may have either direct or indirect effect on people's KSB (Hew & Hara, 2007; Chen, 2011; Liao, To & Hsu, 2013). Considering these variables, it is necessary to keep learner participation interaction with one another for KSB that require time and effort as voluntary. If learners believe that they can improve their relationships with other members, they are expected to display a more positive attitude towards knowledge sharing (Bock & Kim, 2002). Well-organized learning activities have a great effect on learners' interactions with one another. Teachers' creation of various discussion environments, as well as sharing and providing support when needed, may improve learners' motivation levels and help them feel a part of the community. Hence, it becomes possible to contribute to the knowledge sharing process.

Based on the results of this study, the following recommendations are put forward for future studies:

- Demographic data related to the participants were neglected in this study. A new study might be conducted using the variables associated with KSB as the control variables.
- Apart from the effects of the variables focused on in this study, the effect of perceived benefit and, thus, respect and reputation on KSB, should be investigated.
- There are studies indicating that knowledge sharing affects learning performance positively. For example, Eid and Al-Jabri (2016) stress the importance of knowledge sharing for increasing learning performance. They also point to the importance of social networking tools for knowledge sharing. Thus, new studies may focus on such tools or activities influencing individuals' motivations, trusts, self-efficacy levels, and sense of community levels and perceived benefits in these environments, which may increase their KSB. Also, future studies may dwell on students' characteristics, perceptions, purposes, and resources (support), as well as environmental factors that can have an effect their KSB. In this way, the effect of KSB on learning performance may be further explored.

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