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The role of modern media technology in improving collaborative learning of students in Jordanian universities

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Abstract. This paper proposes a framework for examining the impact of using social media for collaborative learning between researchers in two universities, namely the University of Jordan and Yarmouk University in Jordan. The proposed framework is based on the Constructivist Theory. The outcomes yielded significant correlations for the interaction with the student, interaction with teachers, engagement, the use of social media in education interaction, and behavioral intention to use social media for collaborative learning among university students. Limitations and future work are also presented.

Keywords: *Social media, Collaborative learning, Social networks, Interaction with the student, Interaction with teachers, Engagement.*

1. Introduction

Collaborative education has spread in many places around the world (Al-Emran, Mezhuyev, & Kamaludin, 2018b; Al-Emran, Mezhuyev, Kamaludin, & AlSinani, 2018a; Al-Emran & Shaalan, 2015a; Al-Mohammadi & Derbel, 2014a). It has achieved remarkable success in improving education and has received a wide attention from researchers because of its positive and effective impact on students' education process (Ahmed & Qazi, 2011; Malik & Al-Emran, 2018). This has revealed the intensive need of adopting new methods of receiving an education (Al-Emran & Malik, 2016; Al-Maroof & Al-Emran, 2018; Al-Mohammadi, 2014b; Al-Mohammadi & Derbel, 2014b; Al Emran & Shaalan, 2014). Esteve Del Valle et al. (2017) said that socialist learning is a structured educational activity that points to the main concerns of improving learning. Some researchers believe that a participatory learning environment can be an effective means of improving students' performance. In this context, many researchers have demonstrated the benefits of engaging in participatory learning, including students' critical thinking improvement, in order to keep their minds in focus (Al-Mohammadi, 2015; Al-Qaysi & Al-Emran, 2017; Paxson, 2018). Nowadays, media technology has gained more attention and interest in its use in collaborative education (Al-Qaysi, Mohamad-Nordin, & Al-Emran, 2018), where learners can perform their activities in a more appropriate way. Technology can, therefore, be a useful tool in collaborative education (Al-Emran & Shaalan, 2017; Mhamdi, 2017d); it gives users the opportunity to interact and participate in an inclusive society. One of the tools of technology used daily by students in the 21st century is social networks including Facebook, YouTube, and live videos (Benckendorff et al., 2014; Collins & Halverson, 2018), which provide learner information which help form their consciousness and identity in order to be more able to influence others. Social media networks also offer language learning by contributing in the translation from one language to another in order to improve the process of communication which, as a final result, assists to mend the differences between cultures. In addition, the

distinction of this technology includes participatory and interactive elements in learning (Piotrowski, 2015).

2. Literature review

Surveying the literature represents the essential step in any research project (Al-Emran, 2015; Al-Emran, Mezhuyev, & Kamaludin, 2018c; Al-Emran, Mezhuyev, Kamaludin, & Shaalan, 2018b; Al-Emran & Shaalan, 2015b; Al-Emran, Zaza, & Shaalan, 2015; Zaza & Al-Emran, 2015). Collaborative learning happens when students collaborate in small units with a shared target, like developing meanings, researching a subject or enhancing proficiencies that form the most advantageous aspects of active learning. That said, the idea of learning includes sharing information, know-how, and authority (Al-rahmi et al., 2015) in the new digital age. Downes (2007) and Siemens (2004) proposed the connectivity theory, where social learning is integrated with social media technologies. In the world of social media proliferation, learning is not an internal, individualistic activity. Instead, learners gather information from connecting to others' knowledge using social media. As social media is becoming increasingly ubiquitous to millennial learners, educators see the potential benefits of using these tools for academic purposes (Debatin, Lovejoy, Horn, & Hughes, 2009; Ellison, Steinfield, & Lampe, 2007; Mohammed Habes, Alghizzawi, Khalaf, Salloum, & Ghani, 2018; Mhamdi, 2017b; S. A. Salloum, Al-Emran, & Shaalan, 2018; S. A. Salloum & Shaalan, 2018a, 2018b). Media technology has infiltrated the 21st century generation of Internet users, making it a very prominent means of communication dissemination, particularly among students at a higher level of education. Consequently, academic activities in institutions and faculties are increasingly carried out through social networks, such as Facebook, Twitter, and LinkedIn. These are essentially used in order to connect with current and potential students and to deliver instructional content (Al-Rahmi et al., 2015; Masa'deh et al., 2017). Recently, in Jordan, the interest of higher education has shifted from the concentration on knowledge skills to highlighting long-term skills learning through social media (Al-Emran & Salloum, 2017; Salloum et al., 2017; Salloumet al., 2018; Salloum et al., 2016; Salloum et al., 2017). Unfortunately, in Jordan, social media studies such as using YouTube, Facebook, and Twitter in education are still in the primer phase, despite the fact that Jordan has ranked first in the world in terms of using social media among Internet users, at a rate of 90% (Chaffey, 2016; Salloum et al., 2017).

There is also limited research on how social media impacts students; in particular, how good it influences students' learning experience (Hew, 2011; Mhamdi et al., 2018; Mix et al., 2010; Salloum et al., 2018; Salloum et al., 2017; Salloum et al., 2017; Salloum et al., 2017). Common themes in previous research in Jordan are to determine the level of students' understanding, satisfaction, and academic performance outcome through social media, but most students use it for personal reasons and rarely for educational or learning purposes (Hew, 2011). Studies show that the adoption of online video platforms by social networks leads to a positive relationship between students' cooperative education and satisfaction (Al-Rahmi et al., 2015). One study attempted to identify the specific underlying motivations for watching video content; whether it increases or decreases the degree of proliferation power of digital education technology to improve cooperative education in Jordan. Masa'deh et al., (2017) examined whether there are differences between users or non-users of online video platforms in terms of user motivation for watching video content based on the high use of digital media in Jordan at 80% in comparison to other countries. Employment in this field of education in Jordanian universities is unfortunately rarely studied (Salem, 2017). Modern media technology as having the potential to facilitate higher-level learning outcomes via collaborative learning appears evident as supported by studies in the literature. Despite the positive role played by collaborative education technology across the network, questions arise about the impact of social media on collaborative education and the possibility of using it as an effective pedagogical tool to improve collaborative education for Jordanian university students through the idea of integrating technology into the education process. The purpose of this paper is to identify whether collaborative education on Jordanian university student through digital media technology has a substantial impact on students via social media tools such as video/photo/online videos through factor needs and gratification using the technology acceptance model (TAM).

3. Research Model

This paper proposes a framework for the impact of the use of social media for collaborative learning in two universities, which are the University of Jordan and Yarmouk University within the Jordanian higher education institutions based on the Constructivist Theory (Vygotsky, 1978); see Figure 1, "the framework

of the research with hypotheses." The current study revealed the integration of social media-related cooperative learning among students, with the variables of social media and tools such as interaction with students (IS), interaction with teachers (IT), engagement (E), use of social media in educational interaction (USM), and behavioral intention (BI) (see Figure 1).

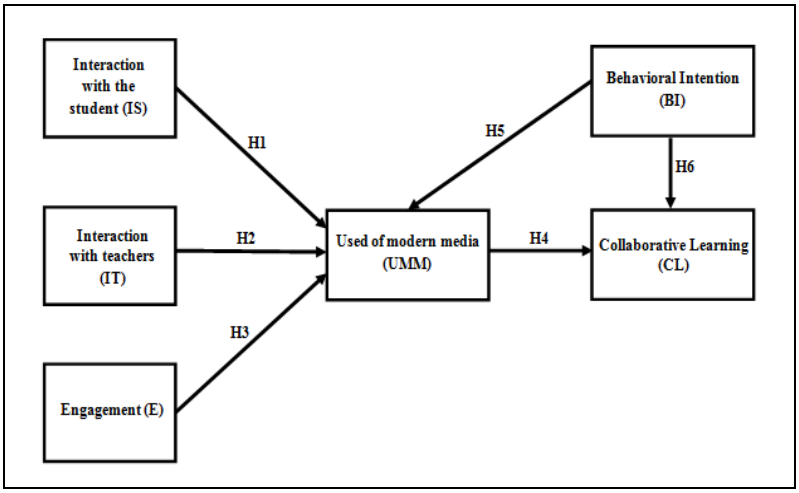

Figure 1. Conceptual Framework.

3.1 The use of Social Media and interaction with the members of the group and teachers

The use of social media and interaction with the members of the group and the Grandees facilitate the use of social media and interaction with members of the group facilitate the means of social communication and cooperation, contribute to the development of relations between the students, and offer immediate opportunities to disseminate and improve curricula outside the actual classroom (Patera et al., 2008). The use of social media as a means for communication in school activities, such as discussions, enables students to explore the topic and interact with the content (Habes et al., 2018; Habes et al., 2018). This increases the potential for higher education students to learn beyond the issue posed by the supervisor or coach (Al-Rahmi et al., 2015). In a related study, it has been confirmed that social media promotes the exchange of information and through providing students with experience in the virtual community, they can understand the content and network across different sources (Al-Mohammadi, 2014a). This opportunity paves the way to further enhance students' learning through interaction. Moon and Kim (2001) and Pelling and White (2009) integrated social media in their own teaching methods and made sure of the type of social media used with the learning outcomes in order to improve academic performance (Al-Rahmi & Othman, 2013). On the basis of the discussion above, the following assumptions were proposed:

H1: There is a significant relationship between students and the use of social media.

H2: There is a significant relationship between teachers and the use of social media.

H4: There is a significant relationship between the use of social media and collaborative learning.

3.2 Modern media and Engagement

Social media use and engagement in the context of education results in a learning environment characterized by greater collaboration and communication brought about by peer discussion and interactions (Hamid et al., 2009). Additionally, according to prior studies (Habes et al., 2018; Kushin & Yamamoto, 2010), social media opens the door to develop a higher sense of student community via collaboration among peers on certain topics. Moreover, social networking sites (SNSs), social capital, and psychological well-being offer an additional link to student learning through the mechanism of academic engagement and increased engagement with educational institutions. On the one hand, students who enjoy their experience become highly engaged with social media, which is often viewed positively by students, researchers, and technology providers. In fact, social networking sites allow users to create

personal files, examine contents, and participate in communication through messages with other users of the system (Boyd & Ellison, 2007). Other studies used the term Web 2.0 when dealing with various social networks. The following assumption was thus proposed:

H3: There is a significant relationship between engagement and the use of social media.

4. Research Methodology

The quantitative research method was used to gather data to answer the research questions and to explore the objectives of this study (Al-Emran, Mezhuyev, & Kamaludin, 2018a; Mezhuyev, Al-Emran, Fatehah, & Hong, 2018). Quantitative research is defined as a method of collecting data through a survey, and it is specific in its surveying and experimentation as it builds upon existing theories. The methodology of quantitative research maintains the assumption of an empiricist paradigm (Creswell et al., 2003). Quantitative research has a high degree of external validity; in other words, the findings can be generalized. According to Al-Najjar (2012), "the quantitative approach usually uses a larger sample size than qualitative research". The study included Jordanian university students pursuing their BA, MA, and Ph.D. The questionnaires were randomly distributed to the sample of the study, and the researcher has selected the students of the University of Jordan as a sample of the study where it is one of the largest and oldest universities in Jordan. It also has the largest number of diverse colleges and the largest number of students in terms of diversity in nationalities, which proved useful to achieve this study's aim.

According to the Jordanian Ministry of Higher Education, the number of students at the University of Jordan was 43,134, while in Yarmouk University, the number was 45,254 during the year this study was undertaken. The actual number of sample was 300 and distributed among 144 males and 152 female students. Random sampling was applied using Yamane's (1973) formula with a 95% confidence level to determine the correct sample size for a fair representation of the students.

5. Data Analysis

5.1 Questionnaire Pilot Study

Prior to conduct the final survey, a pilot study was carried out to measure the reliability of the questionnaire items. For this study, 40 students were randomly selected from the target population. The Cronbach's alpha was used to measure the internal reliability of the constructs' items. According to (Alrawashdeh, Firstauthor, & Secondcoauthor, n.d.), a reliability coefficient of 0.70 or above is deemed to be acceptable. In this study, the Cronbach's alpha values for all the constructs were above 0.7 as shown in Table 1. Therefore, all the constructs were reliable, and hence, they can be used in the final study.

Construct	Cronbach's alpha
Behavioral Intention (BI)	0.872
Collaborative Learning (CL)	0.866
Engagement (E)	0.759
Used of modern media (UMM)	0.733
Interaction with the student (IS)	0.721
Interaction with teachers (IT)	0.760

Table 1. Questionnaire relies on survey measurement scale Cronbach's alpha.

5.2 Partial least square analysis methodology

5.2.1 Assessment of the measurement model (Outer model)

As far as the PLS-SEM (Partial Least Squares-Structural Equation Modeling) is concerned, the Smart PLS is a widely used software developed by (Hair Jr, Hult, Ringle, & Sarstedt, 2016). The PLS-SEM was applied to evaluate the structural models and measurements in this study. The link among the latent constructs is indicative of the structural model, while the relationship between the indicators themselves refers to the measurement model (outer model). The PLS-SEM together with the greatest probability method was used to measure the proposed model (Anderson & Gerbing, 1988). To establish convergent validity and reliability, several measurements were performed that involved Average Variance, Factor Loadings, and

Composite Reliability. Factor loadings are used to determine the correlation value and weight of every questionnaire variable as a perceived indicator, whereas the factors' dimensionality can be represented through the bigger load value. In addition, the Composite Reliability (CR) measure has been suggested to measure reliability. The CR has a similar goal since a precise value is offered through the use of factor loadings in the constructed formula. The average quantity of variance in the given variable which explains the latent construct is referred to as the AVE (Average Variance Extracted). The convergence of every factor can be analyzed through the AVE, and it can be easily done, when the discriminate validity is greater than one factor. From table 1, the condition for the convergent validity and reliability has been exceeded by our findings for the convergent validity and questionnaire reliability. Moreover, the "Table 2" illustrates a summary of the validity and reliability of the questionnaire. Also, it shows the analysis finding for every factor and it is done by presenting the variable obtained from the questionnaire.

5.2.1.1 Convergent validity

Subsequent to (J. F. Hair, Black, Babin, & Anderson, 2010), the variance extracted, factor loadings and reliability (consisting of Cronbach's Alpha and composite reliability) were used as signs to determine the relative amount of convergent validity. The value 0.7 is exceeded by reliability coefficient and composite reliability (CR) for all of the constructs, which points out internal consistency among multiple measurements of a construct (Joseph F Hair, Black, Babin, Anderson, & Tatham, 1998). From table 3, the acceptable value of 0.7 is surpassed by the Cronbach's alpha scores (Gefen, Straub, & Boudreau, 2000; Nunnally & Bernstein, 1978). In addition, composite reliabilities of constructs lie between 0.710 and 0.899. The condition of explaining 50% of variance extracted among a set of items is fulfilled by all average variance extracted (AVE) values, ranging from 0.551 to 0.622 (Falk & Miller, 1992) and it is assumed to be the cause of triggering the latent construct. Consequently, convergent validity is thought to be achieved by the scales for assessing the constructs.

Constructs	Items	Factor Loading	Cronbach's Alpha	CR	AVE
Behavioral Intention	BI1	0.774	0.715	0.757	0.551
	BI2	0.863			
	BI3	0.700			
	BI4	0.755			
	BI5	0.757			
Collaborative Learning	CL1	0.720	0.712	0.770	0.622
	CL2	0.717			
	CL3	0.877			
	CL4	0.705			
	CL5	0.892			
Engagement (E)	ENG1	0.876	0.888	0.788	0.571
	ENG2	0.854			
	ENG3	0.750			
	ENG4	0.844			
	ENG5	0.735			
Use of modern media (UMM)	UMM1	0.749	0.776	0.710	0.605
	UMM2	0.772			
	UMM3	0.740			
	UMM4	0.795			
	UMM5	0.745			
Interaction with the student (IS)	IS1	0.738	0.762	0.807	0.523
	IS2	0.748			
	IS3	0.755			
	IS4	0.756			
	IS5	0.720			
Interaction with teachers (IT)	IT1	0.861	0.722	0.899	0.555
	IT2	0.892			
	IT3	0.781			
	IT4	0.722			

	IT5	0.863			

Table 2. Convergent validity results which assures acceptable values (Factor loading, Cronbach's Alpha, composite reliability >= 0.70 & AVE > 0.5).

5.2.1.2 Discriminant validity

Since all AVE values are greater than the squared correlation between the constructs in the measurement model, the conditions of discriminant validity are hence fulfilled (reference Table 4). Generally, when the AVE value is above 0.5, the construct founds a minimum of 50% of the measurement variance. For determining the discriminate value, the researchers used the Partial Least Squares (Smart PLS ver. 3.2.6). The loadings and cross-loadings are included in table 6. In addition, the loadings and cross-loadings were comprehensively investigated, and it was found that rather than loading on other constructs, the measurement items all load mostly on their own latent constructs. The square root of the AVE scores is illustrated by the bold diagonal elements in the table. On the other hand, the correlations among the constructs are indicated by off-loading diagonal elements. The table clearly depicts that the square root of the AVE values comes between 0.771 and 0.851, which is assumed to be higher than the suggested value of 0.5. Compared to any correlations, the AVE is believed to be higher with the construct; i.e., for every construct explicitly indicating a greater variance of all constructs with their own measures instead of other constructs in the model by which the discriminate validity is enhanced.

5.2.2 Assessment of structural model (Inner model)

5.2.2.1 Coefficient of determination -R^2

The researchers usually examine the structural model by making use of the coefficient of determination (R^2 value) measure. This coefficient is treated as the squared correlation between a specific endogenous construct's actual and predicted values. Moreover, the predictive accuracy of the model can also be gauged through it. The coefficient is to denote the joined effect of exogenous latent variables on an endogenous latent variable. The squared correlation between the actual and predicted values of the variables is referred to as the coefficient; hereafter, it further involves the degree of variance in the endogenous constructs protected by the every discovered exogenous construct. Chin, (1998) was of the view that the value above 0.67 is considered as high. However, the weak values were found in the scope of 0.19 to 0.33, whereas, the direct values were reported in the scope of 0.33 to 0.67. Additionally, when the estimation is below 0.19, it is said to be as inadmissible. According to figure 3, the model has reportedly moderate predictive power, which sustains almost 63.6%. According to Table 6, the R^2 values for the Used of modern media and Collaborative Learning were found to be between 0.33 and 0.67; and hence, the predictive power of these constructs is considered as moderate.

	Behavioral Intention	**CL**	**E**	**UMM**	**IS**	**IT**
Behavioral Intention	**0.781**					
CL	0.301	**0.721**				
E	0.454	0.423	**0.901**			
UMM	0.289	0.511	0.377	**0.855**		
IS	0.275	0.324	0.555	0.488	**0.877**	
IT	0.391	0.290	0.457	0.434	0.522	**0.893**

Table 3. Fornell-Larcker Scale.

	BI	CL	E	UMM	IS	IT
BI1	**0.774**	0.388	0.168	0.265	0.223	0.221
BI2	**0.863**	0.331	0.546	0.521	0.367	0.475
BI3	**0.700**	0.567	0.382	0.401	0.459	0.236
BI4	**0.755**	0.211	0.362	0.260	0.261	0.233
BI5	**0.757**	0.355	0.399	0.175	0.498	0.250
CL1	0.383	**0.720**	0.325	0.591	0.464	0.366
CL2	0.472	**0.717**	0.257	0.368	0.368	0.478
CL3	0.511	**0.877**	0.168	0.181	0.195	0.146
CL4	0.435	**0.705**	0.219	0.456	0.274	0.249
CL5	0.271	**0.892**	0.505	0.474	0.403	0.271
ENG1	0.263	0.301	**0.876**	0.382	0.533	0.296
ENG2	0.372	0.322	**0.854**	0.229	0.427	0.249
ENG3	0.228	0.416	**0.750**	0.143	0.381	0.231
ENG4	0.331	0.578	**0.844**	0.418	0.596	0.225
ENG5	0.382	0.206	**0.735**	0.40	0.518	0.295
UMM1	0.296	0.294	0.246	**0.749**	0.441	0.325
UMM2	0.375	0.162	0.403	**0.772**	0.490	0.351
UMM3	0.247	0.389	0.677	**0.740**	0.493	0.402
UMM4	0.230	0.236	0.555	**0.795**	0.270	0.538
UMM5	0.556	0.371	0.451	**0.745**	0.220	0.506
IS1	0.337	0.239	0.543	0.425	**0.738**	0.561
IS2	0.205	0.165	0.135	0.306	**0.748**	0.249
IS3	0.210	0.245	0.199	0.442	**0.755**	0.280
IS4	0.251	0.130	0.286	0.328	**0.756**	0.515
IS5	0.383	0.139	0.284	0.220	**0.720**	0.268
IT1	0.247	0.189	0.277	0.543	0.393	**0.861**
IT2	0.230	0.436	0.455	0.323	0.210	**0.892**
IT3	0.356	0.471	0.351	0.380	0.490	**0.781**
IT4	0.237	0.439	0.347	0.381	0.352	**0.722**
IT5	0.505	0.465	0.335	0.289	0.412	**0.863**

Table 4. Cross-loading results.

Constructs	R^2	Results
Used of modern media	0.544	Moderate
Collaborative Learning	0.591	Moderate

Table 5. R^2 of the endogenous latent variables.

5.2.2.2 Test of the hypotheses - Path coefficient

To validate the proposed hypotheses, a structural equation model and SEM-PLS with the maximum possibility estimation was used, so that the bonds among the theoretical constructs for the structural model could be evaluated. It can be seen in the table that all the values were in the given range. In addition to it, few direct hypotheses also showed support (M. Habes et al., 2018; Ma & Yuen, 2011; S. A. Salloum, Al-Emran, Shaalan, & Tarhini, 2018; S. A. S. Salloum & Shaalan, 2018). The resulting path coefficients of the suggested research model are shown in Figure 2. Generally, the data supported all

hypotheses. Based on the data analysis hypotheses H1, H2, H3, H4, H5, and H6 were supported by the empirical data. The results showed that Used of modern media significantly influenced Interaction with the student (β= 0.171, P<0.001), Interaction with teachers (β= 0.236, P<0.01), Engagement (β= 0.281, P<0.05), and behavioral intention (β= 0.377, P<0.001), supporting hypothesis H1, H2, H3, and H4 respectively. Behavioral intention and use of modern media were determined to be significant in affecting collaborative learning (β= 0.802, P<0.001) and (β= 0.201, P<0.001) supporting hypotheses H5 and H6. A summary of the hypotheses testing results is shown in Table 6.

Hyp.	Relationship	Path	*t*-value	*p*-value	Decision
H1	Interaction with the student → Used of modern media	0.171	19.747	0.000	Supported**
H2	Interaction with teachers → Used of modern media	0.236	9.771	0.009	Supported**
H3	Engagement → Used of modern media	0.281	1.916	0.031	Supported*
H4	Behavioral Intention → Used of modern media	0.377	11.566	0.000	Supported**
H5	Behavioral Intention → Collaborative Learning	0.082	8.894	0.001	Supported**
H6	Used of modern media → Collaborative Learning	0.201	11.513	0.000	Supported**

Table 6. Results of structural model (significant at p < = 0.01, p* < 0.05).**

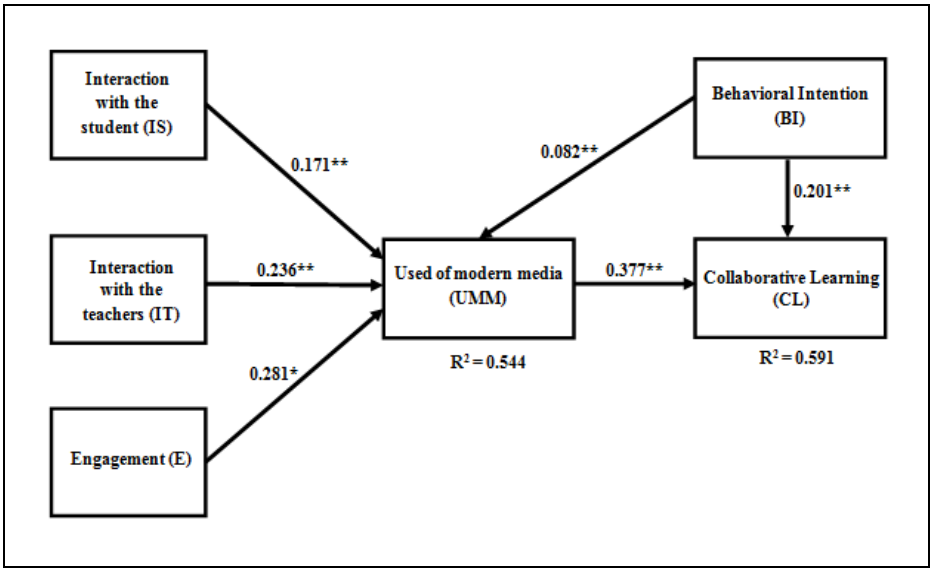

Figure 2. Path coefficient results (significant at p < = 0.01, p* < 0.05).**

6. Conclusion

Social media has become an integral part of our daily lives (Mhamdi, 2016, 2017c); affecting several sectors where education made no exception (Mhamdi, 2017a). This social media impact has altered various aspects of teaching and learning. The purpose of this paper on identifying whether positively or negatively themed Collaborative Education on Jordanian Universities Students through Digital Media Technology have a stronger impact student regarding by tools of social media such as video/photo / online videos, with factors needs and gratification using technology acceptance model (TAM). The significant determinants of students' behavioral intention (BI) as per the study findings are the interaction with the student (IS), interaction with teachers (IT), Engagement (E), and use of social media in education interaction. This corroborates the likely implementation of the extended TAM in the Jordanian background. Regardless of potential problems already mentioned, our findings indicated that collaborative education is well accepted in Jordan.

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