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Impact of Student Engagement on Affective Learning: Evidence from a Large Indian University

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Abstract This study has two objectives. The first objective is to examine the mediating role of intellectual engagement in the relationship between online engagement and affective learning. The second objective is to investigate the mediating role of academic engagement in the relationship between intellectual engagement and affective learning as well as between online engagement and affective learning. The study sample comprises of undergraduate students studying in a large private Indian university. The results of structural analysis using 280 responses collected from the undergraduate students support the hypotheses that academic and intellectual engagement constructs mediate the relationship between online engagement and affective learning. Moreover, it was found that compared to intellectual engagement, the role of online engagement is statistically more central to enhancing academic engagement and in turn affective learning. The findings encourage educators to provide academic settings backed by online resources instead of depending only on online resources.

Keywords Academic engagement · Affective learning · Intellectual engagement · Online engagement · Student engagement

Rapid globalization by means of technological advancement has made universities devise new pedagogy and methods to impart learning in a flexible and creative manner. Indian Universities particularly are increasingly using internet as a creative way of imparting knowledge to the students (Thien and Razak 2013). However, installation of modern facilities requires capital investment that is ultimately reflected in the increased education fee charged from students (Tilak 2014). This could be a reason for the low enrollment rate of 17.9 % in higher education (estimated for 2011–12) compared with 26 % in China and 36 % in Brazil (British Council 2014). The government of India has set an ambitious goal to take this rate to 30 % by 2020–2021 (Planning Commission 2013) and learning through internet based e-learning (Pathak and Pandey 2012) can be a way to achieve this target without compromising on the quality of education (University Grants Commisison 2012).

Given the worrisome figures relating to the Indian higher education and the high initial cost of arranging resources necessary for technology aided learning such as online learning, it is important to ascertain the effectiveness with which such initiatives can improve student learning. To the best of authors' knowledge, this is the first study that examines the relationship between online engagement and affective learning in the context of Indian higher education as studies to date were done either in the Western Countries or in the few developing nations such as China (Ma et al. 2015). Therefore, the main research objective of the current study is to explore and test the mechanism through which the student-internet attachment called 'online engagement' (OE) can help them in enhancing affective learning in the Indian higher education.

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Theory and Hypotheses

Learning for a student populace can be looked at through multiple lenses such as the level of participation and grades earned. One such learning outcome is affective learning (AL) which is associated with higher "affect" for instructor and higher perception of achieved learning (Richmond et al. 1987). Krathwohl et al. (1964)) defined affective learning as "objectives which emphasize a feeling tone, an emotion, or a degree of acceptance or rejection" (p. 7).

For the purpose of this study, the authors define affective learning based on Christophel's (1990) work. In that, affective learning comprises of students' attitude about the course content, instructor and recommended behaviors. It also measures the likelihood of engagement in desired behaviors and enrollment to other classes. Student learning stems from the engagement of student in academics in the forms of study or practice of subjects, thus student engagement is regarded as a good predictor of learning. Similarly the feedback from teachers during interactions also helps in the process of learning (Kuh 2003). However, this feedback is not face-to-face in case of online learning. Student engagement also leads to development of habits that foster learning (Shulman 2002) thus we propose that online engagement would lead to affective learning.

Student engagement has been conceptualized and operationalized by different scholars in a variety of ways (Parsons and Taylor 2011); it has been linked to objective and subjective measures of student performance (Pandey and Nagesh 2013). In summary, student engagement involves willingness, quality of effort put in and degree of their interest (Krause 2005) in educational, academic or learning activities (Bulger et al. 2008). In addition, Coates (2007) suggested two more components namely, 'active and collaborative learning' and 'communication between student and faculty'. Despite these discrepancies, most definitions are based on the premise that student engagement is a student centric phenomenon and involves active role of students in learning activities that are the part of academic activities.

Existence of multiple definitions suggests that student engagement comprises of distinct elements and interactions such as, teacher-student, student-student (peer to peer), and student-learning material to name a few (Beer et al. 2010). Engagement through face-to-face interactions requires physical presence of both parties and is expensive with reference to the infrastructural requirements to facilitate such learning and devotion of time by both parties at same time (Gupta 2015; Gupta and Kumar 2015; Gupta and Sayeed 2016). Other forms of interaction that do not require such constraints is being preferred by students in developing countries, one such interaction that is gaining acceptance and is on the rise is the in traction between student and online study material that enhances online learning (Ma et al. 2015). The ease, flexibility and reusability of such study material encourage institutes to promote online learning (Arbaugh 2000). This is evident due to two main reasons firstly student belonging to the weaker section of society do not have the financial resources to attend face to face learning and secondly many are engaged in jobs during the day and thus find it difficult to attend traditional institutions (Pandey and Singh 2015). This is further facilitated by the device explosion in India especially mobiles which are easily available to them.

The learning that takes place through internet based courses has been explained by the Technology Acceptance Model (TAM). The TAM model advocates the perceived usefulness of a technology and the perceived ease of use of a technology as important determinants of engagement in online medium (Davis 1989; Davis et al. 1989). The usefulness of technology and the decision to use it in learning activities are affected by these variables. Individuals' extrinsic motivation to use technology is explained by perceived usefulness whereas intrinsic motivation is explained by perceived ease of use (Atkinson and Kydd 1997; Davis 1989). Moreover, usage of computer software (Bagozzi et al. 1992), e-mail (Gefen and Straub 1997) and the internet (Atkinson and Kydd 1997) can be explained by this model. Dixson (2012) concluded that the importance of considering online engagement for future research increases because a sizable number of studies suggest that online engagement results in a better student performance than engagement through chalk and board (e.g., Maki and Maki 2007; Robinson and Hullinger 2008).

Another way by which students engage is 'academic engagement' (AE). It is defined as, the time put forth by students on the academic activities in an academic setting. Examples of such activities include reading and writing, class participation and doubts clarification (Greenwood et al. 1984). Soria and Stebleton (2012) measured it through frequency of student-faculty interaction and contribution to the class discussion. However, this paper is focused on Krause and Coates' (2008) measure of academic engagement as it facilitates probing of students' academic workload and study patterns including time spent on academic activities and communications.

Along with online and academic engagement, intellectual engagement (IE) is also an important component of student engagement. Intellectual engagement refers to the investment in the form of emotions and cognition through skills that involve higher order thinking to understand and construct knowledge (Willms et al. 2009). Measures of the intellectual engagement construct include motivation, satisfaction and intellectual stimulation from academic activity (Krause and Coates 2008).

Overall, student engagement has been increasingly understood as a prerequisite for effective learning (Pittaway 2012) and it has been found that the student learning is closely associated with the efforts instructor puts in creating an interactive environment in classroom (Arbaugh 2000) on the side of students it has been seen that student's academic preparation are positively associated with higher levels of engagement (Hu and Kuht 2002). Online learning is one of the creative means of delivering content in the classrooms. Online learning is getting

popular day by day with technological advancements and refinements even video games and supplemental text is shown to heighten engagement among students (Marino et al. 2014).

Prior literature suggests the contribution of different instructional formats, student-teacher relationships, use of feedback, facilities, and the internet to student engagement. Research in the past It has been found that the use of different instructional learning formats led to increased engagement in students (Gregory et al. 2014). The positive relationship between teacher and student also leads to student engagement (Conner and Pope 2013). However, studies have shown that technology holds the potential to enhance student engagement with feedback (Hepplestone et al. 2011). For engaging students, learning climate in terms of facilities provided to the students is important (Willms et al. 2009). Today, the introduction of the internet as a means to improving such learning climate is common in most of the Indian universities. Due to the vital role of online activities in improving the levels of academic engagement, and learning (Torrisi–Steele and Davis 2000), we state that:

> **H1:** Academic engagement mediates the relationship between online engagement and affective learning and
> **H2:** Academic engagement mediates the relationship between intellectual engagement and affective learning.

Researchers have found connections among intellectual engagement, academic engagement and learning, but not all taken together. For instance, Chamorro-Premuzic et al. (2006) found intellectual engagement as an antecedent of academic performance. Likewise, academic advising, which is arguably a facilitator of academic engagement, enhances affective learning (Campbell and Nutt 2008). Scholars over the years have found student engagement and learning related to each other. For example, Carini et al. (2006)) discovered that student engagement positively affects student learning and some even termed it as engaged learning. Therefore we propose to test the below hypothesis (see, Fig. 1 for the model):

> **H3:** Intellectual engagement mediates the relationship between online engagement and affective learning.

Method

Participants and Procedure

The sample for the current study consisted of 280 full-time undergraduate students (144 males, 136 females, response rate = 56 %) from a large private Indian university. The participants were within an age range of 18 to 23 years (M = 20.36, SD = 1.65). The respondents were enrolled in a variety of three to four year undergraduate courses, but the survey was restricted to the second year undergraduate students as engagement requires familiarity with the system. The university ensures that each class gets students in such a way that it represents the demographic diversity of students of the entire country. Also, the university provides a similar blend of classroom and online learning support to all its students irrespective of the course they are enrolled in. The online support includes online video sessions, social media interactions, Google groups for teacher–student, and student–student interactions. Study-discipline-wise, 14.3 % were studying management, 15.4 % were doing their engineering, 12.1 % were in arts courses, 13.9 % were in commerce courses, 13.6 % belonged to science courses, 16.1 % were studying law, and the rest belonged to the 'others' category.

Data were collected by distributing paper-and-pencil questionnaires in the classrooms in the same order by a co-author. The same author administered the questionnaires to all the classrooms. All the students of a particular class were asked to complete the questionnaire within 20 min and were told to feel free to ask questions if they face any issue while filling-up the questionnaire. To get genuine responses, the questionnaires maintained anonymity and the respondents were assured that the data will be used purely for the purpose of research.

Measures

Well-established scales were used to measure the four variables included in the proposed model. Krause and Coates's (2008) 10-item (α = .67), 13-item (α = .85) and five-item (α = .80) scales were used to measure academic engagement, online engagement and intellectual engagement respectively. The respondents were asked to rate their response on a four-point Likert type scale ranging from 'strongly disagree' to 'strongly agree'. A sample item for academic engagement was 'I regularly study on the weekends'; for online engagement was 'Subjects offered online with no face-to-face classes are useful' and for intellectual engagement was 'The lectures often stimulate my interest in the subjects'.

Affective learning was measured using the four questions scale set used by LeFebvre and Allen's (2014) (α = .85). This scale is based on Christophel's (1990) seminal work. The respondents were asked to rate their response on a seven-point semantic differential scale with different dimension for each question. A sample item for affective learning was 'overall, the instructor I have in the class is:' and the respondents were asked to rate it on four bi-polar options such as bad-good, valuable-worthless, unfair-fair, and positive-negative.

Data Analysis

Reliability of each scale was measured using Cronbach's alpha values and composite reliability scores. Pearson correlation coefficients and average value extracted (AVE) values

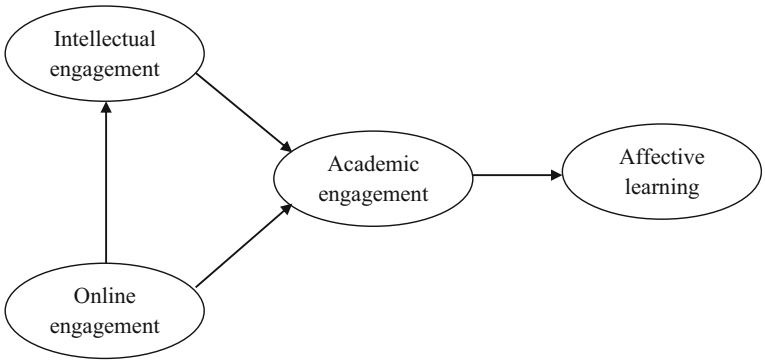

Fig. 1 The hypothesized student engagement-learning model

were used to find the significance of association between two constructs. Exploratory factor analysis was performed on the data with Varimax rotation to check for discriminant validity because the measures used in this study were not normed for Indian context. It was followed by testing the measurement model and doing the path analysis.

The measurement model was tested before the structural model to know the fit between the actual and the expected co-variance matrices for latent variables. Path analysis, which is a part of structural equation modeling, was done to know the fit between the theoretical and observed co-variance matrices. This analysis also gives the path-coefficients for the relationship between the latent and the observed variables. The hypothesized model (Model 0) was tested with all the variables under investigation. In order to eliminate the possibility of alternate models, Model 1 (without IE) and Model 2(without AE) were also tested. It is one of the most rigorous statistical techniques to examine the overall fit of a model and to test complex models that include mediating variables. This technique uses a set of model fit indices other than the chi-square test (Bentler and Bonett 1980). Four model fit indices have been reported here, namely, comparative fit index (CFI ≥ .90 acceptable fit), the root mean square error of approximation (RMSEA < .08 acceptable fit), χ^2/df (χ^2/df ≤ 3.00 acceptable fit) and the incremental fit index (IFI ≥ 0.90 acceptable fit) (Bentler 1990; Bollen 1989; Brown and Cudeck 1992).

Results

Exploratory factor analysis using SPSS software resulted in a Kaiser-Meyer-Olkin of .94 and significant Bartlett's test of sphericity (p < .001). All the items with factor scores more than 0.50 loading clearly on different factors. The factor scores less than 0.50 were suppressed and Varimax rotation was performed to get a clearer view of the factors. The factors converged in six iterations. Eigen values for AL, OE, AE, and IE were 10.38, 7.55, 6.67, and 4.22 respectively and the total % variance explained was 23.58, 17.15, 15.17, and 9.60 respectively. The constructs were found to be reasonably distinct from each other.

Pearson correlation coefficients among the study variables were calculated using SPSS and were found to be significant. The reliability coefficients – Cronbach's alpha values for each scale were also more than 0.80 and so, the questionnaire had internal consistency.

Both, correlation matrix and Cronbach's alphas are shown in Table 1. Using AMOS software, model fit was obtained. The measurement model indicated a good fit CFI = 0.90, IFI = 0.90, RMSEA =0.07, χ^2/df = 2.58) and the convergent validity values satisfied the minimum threshold of 0.50 average variance extracted (AVE) values. Also, composite reliabilities were all above 0.85 indicating that constructs are reasonably associated with each other. The AVE and composite reliability values have been indicated in Table 1.

The default model which is also the proposed theoretical model denoted by 'Model 0' had satisfactory fit indices (CFI = 0.90, IFI = 0.90, RMSEA =0.07, χ^2/df = 2.56). Different sub-models were also tested in order to understand whether there exists a more robust model compared to the default model. Table 2 indicates that, OE – AE – AL model which is denoted by 'Model 1' is also a good fit (CFI = 0.91, IFI = 0.91, RMSEA =0.08 and χ^2/df = 2.71). But model OE – IE – AL which is denoted by 'Model 2' is not a good fit (CFI = 0.91, IFI = 0.91, RMSEA =0.09 and χ^2/df = 3.04) as RMSEA and χ^2/df did not satisfy the minimum criteria of acceptability. These path analysis results are presented in Table 2.

Findings suggest that online engagement significantly affects affective learning but only in the absence of academic engagement. It means academic engagement shares variance with online engagement and affective learning to such an extent that the OE → AL direct effect becomes insignificant. This result supports the hypothesis H1 that AE mediates the OE-AL relationship. Moreover, AE also mediates the relationship between IE and AL as introduction of AE makes IE → AL insignificant from significant thereby supporting our hypothesis H2. Also, in the absence of IE, which is Model-1, the path coefficients increase thereby giving a more robust model.

Table 1 Correlations and reliability coefficients ($N = 280$)

Variable	Mean	S.D.	CR	AVE	1	2	3	4
Age	20.36	1.65						
1. Intellectual engagement	5.71	0.85	0.86	0.56	(.86)			
2. Academic engagement	5.66	0.79	0.91	0.50	.68**	(.91)		
3. Online engagement	5.20	1.13	0.97	0.69	.57**	.76**	(.97)	
4. Affective learning	5.76	0.80	0.91	0.50	.74**	.76**	.61**	(.93)

**$p < .01$ (2-tailed); Parentheses represent Cronbach's alpha values

CR composite reliability, *AVE* average variance extracted

On the other hand, in the absence of OE, the entire model becomes insignificant in terms of model fit. It indicates partial support for hypothesis H3. Therefore, all the hypotheses are either fully or partially supported by the results of this study. It can also be interpreted that compared to IE, the role of OE is statistically more central to enhancing academic engagement and in turn affective learning.

Discussion

The central argument of the present study was that online engagement leads to learning. This argument was echoed by other researchers as well viz. Herrington et al. (2002)) who argued that online learning environment foster student learning. Similarly, a study by Chen et al. (2010)) indicated that use of the learning technology is positively associated with student engagement and learning outcomes. However, a mechanism that reveals the intervening variables that link online engagement to learning has not been empirically studied. Further studies have shown that cultural differences affect the way people engage with technology assisted learning tools (Hannon and D'Netto 2007). This study takes a look at Indian sample and tries to decipher the intervening variables between the two variables.

Theoretical Contributions

Online communities are the new social structures that thrive on modern technological advances and face equally modern challenges. A sense of engagement governs their visits and contributions to the online community (Ray et al. 2014). Our study focuses on the academic arena of this online social structure. The results of this study provide empirical evidence of Kearsley and Shneiderman's (1998) belief that meaningful engagement in learning should take place by having interaction and doing meaningful tasks. In particular, the results of the present study empirically augment Shernoff et al. (2003)) conceptualization that online engagement enhances student learning.

Furthermore, it reaffirms the TAM theory by suggesting that online engagement has a significant role in predicting both, affective learning and intellectual engagement in the default model. From the constructivist frame of reference, we see that the learner creates knowledge out of interaction with learning material, fellow students, and instructor in an online platform. The implication for this paper toward theory is in advancing the discourse on engagement and learning to the Indian higher education context. The mediation of academic engagement between online engagement and affective learning shows that overall affective learning of students would be high if the online interaction of students takes place in an academic setting.

Table 2 Unstandardized path coefficients ($N = 280$)

Relationship	Model 0 (Default Model)		Model 1 (Without IE)		Model 2 (Without AE)	
	Estimate	C.R.	Estimate	C.R.	Estimate	C.R.
OE → IE	0.32 (.04)***	8.82	n.a.	n.a.	0.32 (.04)***	8.76
IE → AE	0.27(.05)***	5.06	n.a.	n.a.	n.a.	n.a.
OE → AE	0.26 (.04)***	7.23	0.35 (.04)***	8.07	n.a.	n.a.
AE → AL	1.56 (.24)***	6.34	1.63 (.24)***	6.81	n.a.	n.a.
IE → AL	0.14 (.10)	1.44	n.a.	n.a.	0.57 (.11)***	5.27
OE → AL	–0.08 (.06)	–1.21	–0.05 (0.06)	–0.72	0.33 (.05)***	6.20

***$p < .001$; Values in parenthesis represent standard error

C.R. critical ratio, *n.a.* not applicable, *IE* intellectual engagement, *OE* online engagement, *AE* academic engagement, *AL* affective learning

Moreover, the results reveal that in absence of online engagement, the entire model becomes insignificant which essentially indicates that online engagement has a key role in ensuring student learning. The proposed default model also extends the work of Bowman and Akcaoglu (2014) which suggests that online discussion forums such as, Facebook help in enhancing students' affective learning. However, unlike previous studies which were restricted to investigate only the association between various types of student engagement, this study theorizes and examines causal relationships among them.

Practical Implications

In addition to contributing to the student engagement, TAM and learning theories, the current study is also beneficial to teachers and university management. The implications of this paper on practice gain momentum due to the proliferation of the internet in our everyday lives, which has led to universities use online or web-based resources as an additional delivery method where sharing of experiences and construction of knowledge takes place (Moore and Marra 2005).

Transition of traditional chalk and talk systems to click and tick system can be witnessed with the rise in programs like massively open online courses (MOOCs), open educational resources; social networking, performance analytics, learning via mobile devices, immersive environments and games, and multinational learning that have significant implications for the support students expect in all delivery modes (Moore and Shelton 2013). However, the results indicate that Indian students still prefer academic settings backed by online resources instead of depending only on online resources.

Previous studies have recommended teachers to enhance engagement through the effective use of online discussion forums (Mokoena 2013). There exists ample scope in text-based internet communication technologies for facilitating effective learning environments that facilitate learning at higher level (Kanuka 2006). In a study comprising of instructors and students it was found that learner–instructor and learner–learner interactions were perceived to have a great impact on quality of online programs by instructors whereas interaction that was built in e learning platform was of importance to students (Su et al. 2005). Teachers of tomorrow should also be ready to adapt to the changing pace of learning sphere.

Studies indicate that familiarity and past experience with technology dictates instructors' preference towards medium of instructions (Su et al. 2005). Therefore, instructors should upgrade themselves to be in sync with changing technology. Training in relevant software and platforms thus becomes imperative. Affective learning is an important outcome of training that can be achieved by a mix of online platform and traditional classrooms based instructions.

Limitations and Direction for Future Research

The study was cross-sectional in nature as the respondents were asked to give their responses only once which limits causal interpretations. However, as suggested by Pace (1984), self-reporting is acceptable and valid under certain conditions such as, when the participants are familiar with the information asked, questions are framed clearly and are based on recent activities, and the questions are non-threatening and non-offensive to the participant.

Another limitation of the present study is that the responses were self-reported which may lead common method bias. But, student engagement, being a psychological condition about one's owns 'self', encouraged authors to use self-reporting technique for data collection. There are also possibilities of transient mood state (Podsakoff et al. 2003) affecting the outcome as respondents are online while answering questions on online engagement. However the bias would not have a severe impact because generally a major portion of a student's day is spent online via laptops, mobiles, tablets and other such gadgets. Due to the inherent flaw of the loss of face to face communication in online learning (Dumont 1996), the content delivery should be coupled with technological tools and teacher expertise to enhance student engagement (Arbaugh 2000).

Research in the future is encouraged to replicate these results at the secondary level education. However, while conducting such study on the adolescents, due care should be taken to ensure that the lack of maturity in the participants does not affect the quality of responses.

Compliance with Ethical Standards

Conflict of Interest The Authors declares that they have no conflict of interest.

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