

The impact of Self-Efficacy on Student Engagement in Online Learning: Mediating the Role of Motivation

¹Dr. Anju Singh, ²Dr. Mehak Gulati, ³Dr. Manoj Kumar, ⁴Dr. Kavita Khadse, ⁵Dr. Ranit Kishore

¹Assistant Professor, Department of Commerce, IIS (Deemed to be University), Jaipur.

²Assistant Professor, Directorate of Online Education, Manipal University, Jaipur.

³Professor, Faculty of Management Studies, MDS University, Ajmer.

⁴Assistant Professor, Systems/ IT, Chetana's Ramprasad Khadelwal Institute of Management & Research Mumbai.

⁵Dean, Management, Tula's Institute, Dehradun.

Abstract

Distance learning is often confused with online learning, though both are different from each other. Talking about online learning or e-education we often discuss about technological advancement and the dynamic changes in the education sector. The major changes happened around the online learning were around Covid-19 while the evolution of online learning goes back to 90's. While talking about online learning the most common aspect is technology, pedagogy used by various teachers and facilitators but the one aspect which affects the learning pattern, student efficiency and engagement of students is motivation. The present paper examines the impact of self-efficacy on student engagement in terms of online learning. The study also analyses the mediating role of motivation on the association between self-efficacy and student engagement. Using primary data from students at Higher Education Institutes at both UG & PG level, the study concludes that the self-efficacy strongly affects students' engagement in online learning. It has been found that the relationship between the two is a strong positive relationship and the mediating analysis supports the view that the mediating variable student motivation only absorbs the part of self- efficacy.

Keywords: online learning, motivation, student engagement, self-efficacy, SMART-PLS.

Introduction

While the development of technology and online courses is being further developed by each passing day. With the importance gained by online learning in last few years the perception of people has also changed regarding it to a great extent, and we can witness this with launch of online learning by Higher Education Institutions around the globe. Now online learning becoming the new way of learning without any restrictions on age, background, geographical location, self efficacy and student motivation becomes the most important factor affecting the online learning. While talking about student

participation now it has become very common to use and talk about student engagement while referring to the student participation in the courses and online learning. There have been lot of studies defining student engagement as the participation and behavioural aspects of students including emotional engagement, cognitive engagement and the behavioural engagement which in turn define the learning of the student and affects the efficiency and motivation as well. Another factor which affects the online learning is motivation, while we talk about motivation in online learning the teacher's perception, methodology used for online learning, design of the course and

various pedagogies used during online learning becomes most important. To motivate a student which remains independent of other factors becomes very much important and can only be controlled to some extent by the teachers by using different and unique methods which not only makes the learning easy and interesting but in turn helps in motivating the students. While talking about online learning and examining the factors affecting it like student engagement and motivation, there is need to talk and learn about self-efficacy which is the belief of the student regarding his own ability, possessed by him required for e-learning. Self-efficacy which remains independent but in turn happens to be the most important factor affecting the learning ability of the student. Self-efficacy is often confused with the student efficiency which is often judged on the basis of student engagement and learning capacity during the course of online learning. "Quality of instruction and learning were found to be the most important factor affecting the motivation among students during online learning. Self-directed learning was found to be one of the positive aspects of online learning which in turn helped in predicted student satisfaction." (Kim, K.-J., & Frick, T. W.). "The study outlined the role of the teachers as they should spend more time in understanding the intention of the student for online learning and should provide customised learning materials and sessions to rule out the uncertainty, anxiety of the students. The teachers should help students in such a manner that they are more assured and self-determined towards online learning." (Kuan-Chung Chen, Syh-Jong Jang). "There is huge difference in parameters affecting the self-efficacy and student engagement when it comes down to online learning and campus learning." (Chin Choo Robinson & Hallett Hullinger). "The study found that student disengagement related with collective reflexivity in relation to joint task can be developed with development of mutual insight which can be a resulted from exercise of collective reflexivity in relation to discuss board and case study sessions." (Kahn, P., Everington, L., Kelm, K.). "The demographic variables like number of online courses enrolled in, gender, academic status of students was found to be the important factors while predicting self-efficacy in online learning." (Demei Shen, Moon-Heum Cho, Chia-Lin Tsai, Rose Marra). "The study concluded that student

efficiency and structure of online learning depends upon the internet efficiency and LMS efficiency." (Alqurashi, E.)

Construct of the Study

The present study aims to examine the relationship between student engagement, student motivation and self-efficacy in the online teaching. In case of online learning the parameters affecting the motivation, self-efficacy is different than campus learning. While we talk about relationship between student engagement, student motivation and self-efficacy, we need to understand how they affect one another in case of online learning. Motivation in students relates with quality of instruction, technological competence, and various demographic variables like age during online learning. While we talk about student engagement it becomes essential to talk about attention span of students and keeping them attentive during online learning. The efficient and effective student engagement during online learning results from innovative sessions including various tools like polls, forms, word cloud to make the session more interactive and engaging. The more innovative and tech savvy online learning sessions are the more will be student engagement. Understanding self-efficacy is important as it stands independent and is related with self-capacity and adaptivity towards online learning.

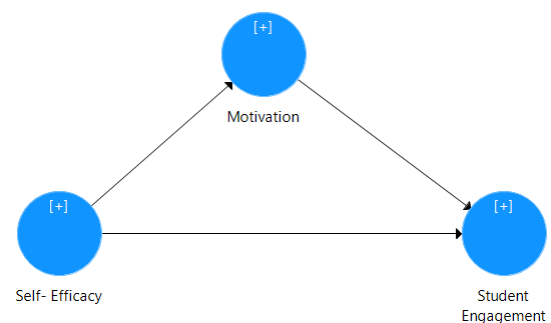


Figure1: Conceptual Model

Hypothesis

H1 Student Motivation predicts Student Engagement.

H2 Self Efficacy Predicts Student Motivation

H3 Self- Efficacy Predicts affects student engagement

H4 The relationship between self- Efficacy and Student engagement is mediated by Student Motivation

Methodology

The present study focuses on the online teaching in the Higher education Institutions of Jaipur, Rajasthan, India. The study is conducted on the management students at both Undergraduate and postgraduate level. The data for the study is collected from July 2020-December 2020. The focus is

Sample Design

The sample is collected from the higher education institutions specifically in the faculty of management. The sample was drawn using based stratified random sampling during the months of June – July, 2021. A total sample of 228 respondents (including 40 responses from Pilot Study) was taken for study. The age group of the respondents is from 18 to 22 years. One fourth of the respondents are the students of post graduate programs whereas the rest of the respondents are the students of graduation attending online classes. Table 1 shows the demographic profile and general information about the students

Table 1: Demographic Profile and General Information

	Frequency	Percent
Faculty		
Male	112	49.1
Female	116	50.9
Degree Pursuing		
Post Graduate	78	34.1
Graduate	150	65.5
Use of E-Learning Tools		
Never	1	0.4
Rarely	5	2.2
Sometimes	92	40.2
Only when Instructed by Teacher	24	10.5
Most of my studies are through e-learning	59	25.8
Always	47	20.5
TOTAL	228	100

Scale Development

Self- Efficacy, Student Motivation and Student Engagement are the variables in the study. The data was collected using a survey questionnaire. The item scales contains section for demographic profile of the respondents,

general information on the perception towards online courses. The items for the variables were measured using Likert Scale with Strongly Agree as 1 to Strongly Disagree as 5 was used for the measurement of each variable. The table below shows the items in the construct.

Table 2: Construct of the Study

Construct	Item	Description
Student	SE1	I participated actively in small-group discussions
	SE2	I discussed ideas from the lessons with others outside of class (like students, family

Engagement		members, friends
	SE3	I can judge the value of information provided by e learning
	SE4	I tend to apply the knowledge I have learned in online classes to real problems or new situations
	SE5	deeply analyse the theories and experiences on e learning
	SE6	I often ask for the instructor about the contents of the less
Student Motivation	M1	Enhance My Interest in Learning
	M2	Online Classes helps in understanding the subject
	M3	I Look Forward to E-Learning Class
	M4	The assignments are interesting and I complete them using E- learning Tools
Self-Efficacy	S1	I work with other students on online projects or assignments
	S2	I am confident that I can learn and do well in the class
	S3	the assessment of the activities or assignment is quick and also fair
	S4	I interacted with the Faculty to review assignments or tests or to ask questions.
	S5	curiosity is increased and i want to learn more
	S6	competing exercises gives a satisfied feeling
	S7	Working on the lessons increases my confidence on e-learning gradually

Results

Measurement Model

The measurement model helps to find out the relationship between the constructs of the study as well as the items in terms of responses. The measurement model includes the Outer reflective model as well as the inner reflective model. (Aziz & Kamaludin, 2014).

Reflective Model

The outer model or the reflective model is first examined for the validity. The items in the present study all selected on the basis of the review of literature. The reliability of the

construct is also measured using Cronbach Alpha. Further the Average variance Extracted and Composite Reliability is measured to examine the Convergent Validity of the construct is measured. The minimum acceptance limit for CR is 0.7 and for Cronbach Alpha also it is 0.70. This is how the model is validated. The measurement of the convergent validity is useful to find out if the latent construct considered in the study are in agreement with each. Outer Loading of the items helps to conclude on this. The acceptance value of the outer loading is greater than 0.708. (Hair et al., 2019). The minimum value acceptable for CR is 0.7. The figure 2 shows the values of the outer loading.

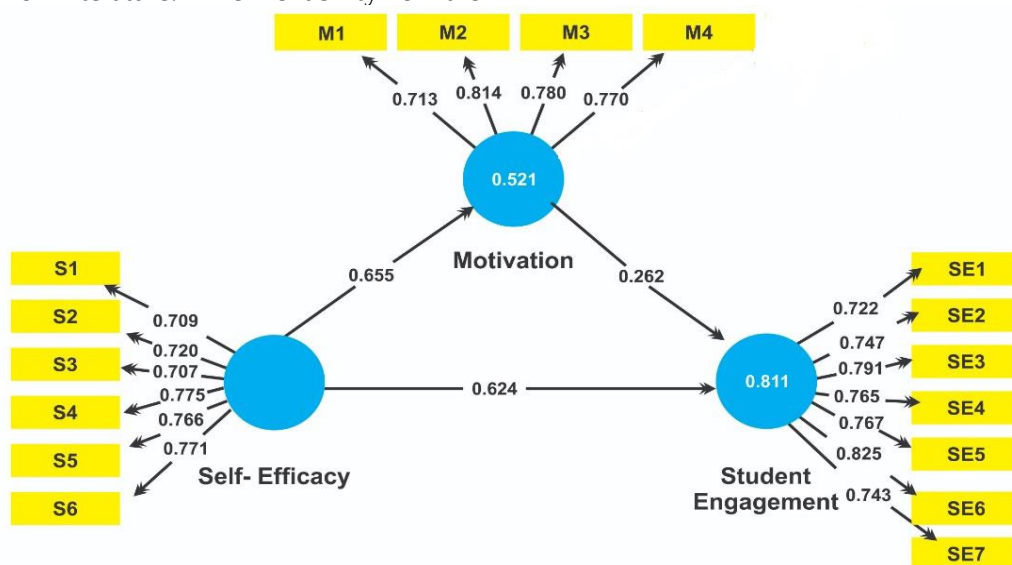


Figure 02: Measurement Model

Source: The Authors

The table 3 below gives the final measurement model with the CR, factor Loading values.

Table 3: Measurement Model

Construct	Item	Factor Loading	Cronbach's Alpha	CR	AVE
Student Engagement	M1	0.713	0.854	0.853	0.593
	M2	0.814			
	M3	0.780			
	M4	0.770			
Student Motivation	S1	0.709	0.880	0.880	0.550
	S2	0.720			
	S3	0.707			
	S4	0.775			
	S5	0.766			
	S6	0.771			
Self-Efficacy	SE1	0.722	0.909	0.909	0.587
	SE2	0.747			
	SE3	0.791			
	SE4	0.765			
	SE5	0.767			
	SE6	0.825			
	SE7	0.743			

From the values of the table 3, it is evident that all the items of the factor loading have the values greater than .708. The Average variance explained for the three constructs is also greater than .50. The values of the Cronbach Alpha for all the constructs are also greater than .70. The composite reliability CR of the constructs is also within the acceptable limit of .70 to .90 as most of the values are closer to .90; the CR of the construct can be considered satisfactory (Hair et al., 2019). In this manner the validation of the outer model is satisfactory and complete.

Table 4: HTMT Ratio

	Motivation	Self- Efficacy
Motivation		
Self- Efficacy	0.754	
Student Engagement	0.758	0.886

Now the consistency in the construct is checked for the discriminant validity to find out if the constructs hold unique characteristics. The Heterotrait Monotrait ratio or HTMT of the construct is measured for the threshold limit of ≤ 0.85 (Henseler et al., 2015) whereas the limit suggested is also .90 (Gold et. al). The table 4 below shows the value of the constructs of the study.

Formative Model

The formative model of the study can be validated through the variance inflation Factor (VIF) for the indicator Collinearity and the relevance of the statistical significance and indicator weights can be scrutinized through bootstrapping. (Hair et al., 2019).

First, the collinearity of the indicators is measured using VIF values. Table 5 shows the value of the VIF for each item in the construct. The value of the VIF is ≤ 3 for all the items which assures of no- multicollinearity in the construct. This confirms that the model is fit for formative analysis and the model is not negatively disturbed by collinearity (Henseler et al., 2015).

Table 5: Collinearity Analysis

Items	VIF
M1	2.103
M2	2.155
M3	1.654
M4	2.482
M5	1.868
S1	1.915
S2	1.769

S3	2.084
S4	2.156
S5	2.053
S6	2.385
SE1	2.767
SE2	2.858
SE3	2.705
SE4	1.987
SE5	1.932

SE6	2.035
SE7	2.103

Further for the hypothesis testing and confirming the significance, bootstrapping was conducted with 10,000 resampling. The results of the path-coefficient, t-statistics and confidence interval bias were examined to examine the hypothesis and relationship between the variables. The table 6 shows the results of the beta, t-statistics and the p-value for the proposed hypothesis.

Table 6: Relevance of the Outer Weights

	β	T- value	P Values	Decision
Motivation -> Student Engagement	0.262	4.276	0.000	Supported
Self- Efficacy -> Motivation	0.655	15.287	0.000	Supported
Self- Efficacy -> Student Engagement	0.624	11.524	0.000	Supported

On the basis of the t-values and p-value in table 6, it can be inferred that the results of the significant with T value > 1.96 and p-value < 0.05. The direct effect is 0.624 which is the beta value of the hypothesis considered for the study.

Structural Model

The structural relationship between the latent variables of the model is examined through the structural model. It is also the inner model of the study which establishes the relationship between the constructs of the measurement model of the study (Aziz & Kamaludin, 2014). The structural model is imperative in order to build conclusions on the hypothesis of the conceptual model developed. The present study on the basis of the earlier studies develops a conceptual model with three constructs and analyses the relationship between them. The structure model of the present study is formative in nature. In order to observe this model, the SRMR value is to be checked. The model fit criteria considers the value of SRMR

to be less than 0.08. In the present study the SRMR is 0.050 within the limit and hence the model is fit. (Gefen et al., 2000).

The R2 value of the student engagement is 0.549 and the R2 value for student engagement is .807. The effect size of all different relationships is measured through the f-square value. The f-square value less than 0.02 shows low effect, however, it is desirable that the values are at least greater than 0.02. The values above 0.15 shows high effect size (Shmueli et al., 2019). Table 7 shows the result of the f-square value of the construct for the student engagement and motivation is 0.097 which is greater than 0.02 but less than 0.15 indicating moderate effect. The effect size for student engagement and self –efficacy which is the direct effect to be examined is 1.191 which is greater than 0.15 showing strong effect. The relationship between self-efficacy and motivation has the effect size of 1.322 which is a very strong effect indicating strong relationship between the independent variable and the mediator.

Table 7: F Square Measuring Effect Size

	Motivation	Self- Efficacy	Student Engagement
Motivation			0.097
Self- Efficacy	1.322		1.191
Student Engagement			

On the basis of the direct effect and the indirect effect, total effect is to be calculated. The total

effect of self-efficacy on student engagement can be calculated using the equation below:

$$\text{Total Effect} = \text{direct effect} + \text{indirect effect}$$

$$= 0.624 + (0.655 \times 0.262)$$

$$= 0.7956$$

As the Total Effect (0.7956) is stronger than direct effect (0.624), this indicates that student motivation plays an important role as a mediator between student engagement and self-efficacy.

Mediation Analysis

After examining the total effect of the model, further it is suggestive to examine the mediation effect for the role of the mediator, which in the present study is student motivation. The hypothesis is to analyze if the mediator is significant in mediating the impact

of the self-efficacy on the student engagement in the online learning. The mediation analysis is done in three phases including a) the analysis of the direct effect of self-efficacy on the student engagement b) examining the significance of the direct effect of the self-efficacy on the student engagement and c) analyzing if the motivation as a mediator absorbs the direct effect of the self-efficacy on the student engagement. (Hair et al., 2019)

To find out the results on mediation analysis, bootstrapping was conducted with 10,000 resamples. From the results of bootstrapping, it can be seen that the indirect effect is found to be significant with t-value greater than 1.96 and p-value being less than .05 as shown in table

Table 8 : Hypothesis Testing on Mediation

		Beta	LL	UL	S D	T Statistics	Decision
Total Effect	Motivation_ -> Student Engagement	0.262	0.140	0.380	0.061	4.276	Supported
	Self- Efficacy -> Motivation	0.655	0.558	0.728	0.043	15.287	Supported
	Self- Efficacy -> Student Engagement	0.795	0.727	0.841	0.028	28.061	Supported
Indirect Effect	Self- Efficacy -> Motivation -> Student Engagement	0.171	0.093	0.256	0.041	4.181	Supported

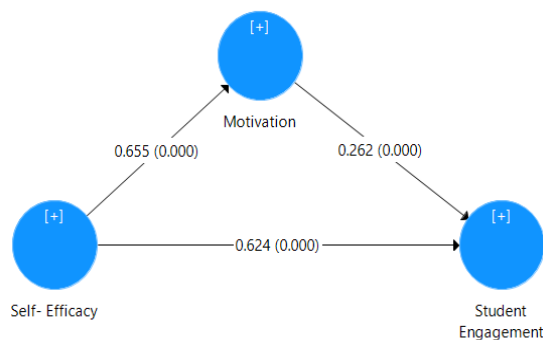


Figure 03: Mediation Analysis

Source: The Authors

The Lower level and the upper level of the confidence interval for the indirect effect in table 8 indicates that there is mediation as there is non-existence of zero in between. (Preacher and Hayes, 2004, 2008). The table 8 also shows the result of the Total effect in the mediation analysis. The total effect is also found to be significant which can be inferred on the basis of p-value, t-statistics and the lower and upper level of the confidence interval bias. On the basis of the table and table, it can be further inferred that the results of the mediation

analysis including both the total effect and the indirect effect is found to be significant. The next step to complete the structural model is to consider the aspects of the mediator and the indirect relationship. The indirect effect is the effect of the self-efficacy on student engagement with the mediation of the motivation. The total indirect effect is 0.171 with p-value as .000. The result gives evidence that there is an impact of the motivation on examining the relationship between self-efficacy and student engagement. Outer loading and outer weights are also found to be significant.

Lastly we assess the level of variance in terms of the importance of mediator affecting the relationship between the dependent and the independent variable. This can be measured though the value of VAF using the formula below. (Hair et al., 2019):

$$VAF = \frac{\text{Indirect Effect}}{\text{Total Effect}} = 0.2156$$

As total effect is 0.7956 and the indirect effect is .171 The VAF is calculated as 21.56 %.

Further, it is important to analyse if the mediation is partial or full. On the basis of the results it can be concluded that there exists partial mediation between the variables as under both the conditions of direct and indirect effect the results are found to be significant as student motivation (mediator) has absorbed only part of the direct effect on Self-efficacy (independent variable). The value of VAF confirms a simple partial mediation effect of student motivation on the relationship between student engagement and self-efficacy. If the value of the VAF lies between .20 to .80 it indicates partial mediation (Hair et al., 2017).

Discussion

After thorough understanding of the models behind the variables of the study and capturing the relevant earlier model, this study provides a conceptual framework and examines the relationship between self-efficacy and student engagement in online learning. The paper proposes a conceptual model which captures this relationship in a pertinent manner.

The results of the study provide significant findings. The self-efficacy strongly affects students' engagement in online learning. It has been found that the relationship between the two is a strong positive relationship. Moreover, there also exists a mediating role of motivation which affects the relationship. There exists partial mediation between the variables as under both the conditions of direct and indirect effect the results are found to be significant as student motivation (mediator) has absorbed only part of the direct effect on Self-efficacy (independent variable). The results also indicate there is significant strong impact of self-efficacy on student engagement in online learning. The results are also supported by the earlier studies which conclude that students with high level of self-efficacy tend to have higher engagement and higher motivation. The total effect is found to be stronger than the direct effect indicating that there is a dominant role of the mediator variable motivating in affecting the relationship between the student engagement and self-efficacy.

In the entirety it can be concluded that the student engagement can be improved with the reinforcement of the motivation. This is going to affect the student engagement of the students

during online learning which will improve the student performance. However, the students with greater self-efficacy might have greater engagement in comparison to the students with low self-efficacy after giving the reinforcement of motivation. This leads us to the future scope of exploration in the above field. Another future scope of the research is where in the model can be further extended to examine the impact of these variables on the student performance through online learning. The study can be also extended for examining the difference in the student performance in online and offline learning.

This study also has its own limitation in terms of the population of the survey. The study has been conducted on a few UG and PG colleges in Jaipur city where regular online learning was conducted during Pandemic. The study can be further extended with samples being drawn from many other cities of the country. It will lead to better prediction and would assess greatly the student's perception towards online learning.

In conclusion, this study analyses the relationship between student engagement and self-efficacy specifically in online learning. It also finds out the role of motivation in mediating this relationship. The findings of this study are relevant in the field of education, psychology and the higher education institutions to restructure and redesign the online learning in such a way so as to achieve the desirable outcomes.

References

- [1] Gefen, D., Straub, D., & Boudreau, M.-C. (2000). Structural Equation Modeling and Regression: Guidelines for Research Practice. Communications of the Association for Information Systems, 4(August). <https://doi.org/10.17705/1cais.00407>
- [2] Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), 2–24. <https://doi.org/10.1108/EBR-11-2018-0203>
- [3] Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based

- structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
- [4] Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, 36(4), 717–731.
- [5] Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879–891.
- [6] Shmueli, G., Sarstedt, M., Hair, J. F., Cheah, J. H., Ting, H., Vaithilingam, S., & Ringle, C. M. (2019). Predictive model assessment in PLS-SEM: guidelines for using PLSpredict. *European Journal of Marketing*, 53(11), 2322–2347. <https://doi.org/10.1108/EJM-02-2019-0189>
- [7] M. Hu and H. Li, "Student Engagement in Online Learning: A Review," 2017 International Symposium on Educational Technology (ISET), 2017, pp. 39–43, doi: 10.1109/ISET.2017.17.
- [8] Thomas K. F. Chiu (2022) Applying the self-determination theory (SDT) to explain student engagement in online learning during the COVID-19 pandemic, *Journal of Research on Technology in Education*, 54:sup1, S14-S30, DOI: 10.1080/15391523.2021.1891998
- [9] Appana, S. (2008). A Review of Benefits and Limitations of Online Learning in the Context of the Student, the Instructor and the Tenured Faculty. *International Journal on E-Learning*, 7(1), 5–22. Waynesville, NC USA: Association for the Advancement of Computing in Education (AACE). Retrieved May 25, 2022 from <https://www.learntechlib.org/primary/p/22909/>.
- [10] Kim, K.-J., & Frick, T. W. (2011). Changes in Student Motivation During Online Learning. *Journal of Educational Computing Research*, 44(1), 1–23. <https://doi.org/10.2190/EC.44.1.a>
- [11] Chin Choo Robinson & Hallett Hullinger (2008) New Benchmarks in Higher Education: Student Engagement in Online Learning, *Journal of Education for Business*, 84:2, 101–109, DOI: 10.3200/JOEB.84.2.101-109
- [12] Kahn, P., Everington, L., Kelm, K. et al. Understanding student engagement in online learning environments: the role of reflexivity. *Education Tech Research Dev* 65, 203–218 (2017). <https://doi.org/10.1007/s11423-016-9484-z>
- [13] Heiberger, G., & Harper, R. (2008). Have you facebooked astin lately? using technology to increase student involvement. *New Directions for Student Services*, 2008(124), 19–35.
- [14] Alqurashi, E. (2016). Self-Efficacy In Online Learning Environments: A Literature Review. *Contemporary Issues in Education Research (CIER)*, 9(1), 45–52. <https://doi.org/10.19030/cier.v9i1.9549>
- [15] Alqurashi, E. (2016). Self-Efficacy In Online Learning Environments: A Literature Review. *Contemporary Issues in Education Research (CIER)*, 9(1), 45–52. <https://doi.org/10.19030/cier.v9i1.9549>