A Study on the Impact of Affective Learning Experience on Attitude towards Technology, Self-regulated Learning and Online Learning Behaviour among MOOC Learners

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ABSTRACT

Different thinking functions, such as sensation, cognition, memory, consciousness, rationality, and pattern recognition, are significantly influenced by the affective learning experience. These different thinking functions and cognitive control are intricately connected to the learning processes and cognitive processing. In this research study, the researcher analyses the influence of the affective learning experience of MOOC learners on their attitude towards technology, online learning behaviour and self-regulated learning behaviour. For the study, MOOC learners were selected. A quantitative approach was adopted by the researcher in this study. The present research follows the descriptive method of the causal-comparative type. It was found that the affective learning experience of the learners influences their attitude towards technology, online learning behaviour and self-regulated learning behaviour.

Keywords: MOOC, affective learning experiences, attitude towards technology, online learning behaviour, self-regulated learning, MOOC learners

Affective learning experiences include a spectrum of often occurring states of mind or feelings. It has emotions, both pleasurable and painful. Classroom activities, teaching methodologies, interaction with educators, and the interactive learning environment within which learning and teaching contribute to what learners perceive as their learning. In traditional educational and online education contexts, the significance of the affective learning experience has been demonstrated. According to Caine & Caine (1991), the learning process is affected and structured by attitude and perspectives based on expectations, perception of self, and the desire for social contact. Different thinking functions, such as sensation, cognition, memory, consciousness, rationality, and pattern recognition, are significantly influenced by the affective learning experience. These different thinking functions and cognitive control are intricately connected to the learning processes and cognitive processing (Vuilleumier, 2005). Much contemporary research examines the effect of affective learning experiences on learning processes. According to studies, positive emotions enhance learning and contribute to academic success through self-motivation and self-regulated learning. It influences the student's learning behaviour (Um *et al.* 2012).

In this research study, the researcher analyses the influence of the affective learning experience of learners from the MOOC program on their attitude towards technology, online learning behaviour and self-regulated learning behaviour.

Statement of the problem

Learners' affective learning experiences from MOOCs have been mainly examined in the current research study to determine the impact on their learning process and behaviour. The researcher investigated attitude towards technology, online learning behaviour, and self-regulated learning behaviour in this study. The problem is stated as 'A Study on the Impact of Affective Learning Experience on Attitude towards Technology, Online Learning Behaviour and Self-regulated Learning among MOOC Learners.'

Research Questions

1. What have been the affective learning experiences of learners using MOOCs?

2. How does the affective learning experience of learners influence their attitude towards technology, online learning behaviour and self-regulated learning?

Significance of the Study

This research investigates the experiences of learners who took part in a Massive Open Online Course (MOOC) on education. Analyzing and exploring these MOOC behaviours contributes to increased knowledge of MOOCs, including examining MOOC programmes at many levels of learning. The researcher may provide practical recommendations for pedagogical and technical improvements that will improve the MOOC learning experience due to these results.

Objectives of the Study

1. To study the overall affective learning experience of MOOC learners.

2. To study the significant differences between the attitude towards technology with respect to the categories of the affective learning experience of MOOC learners.

3. To study the significant differences between self-regulated learning behaviour with respect to the categories of the affective learning experience of MOOC learners.

4. To study the significant differences between online learning behaviour with respect to the categories of the affective learning experience of MOOC learners.

5. To ascertain the correlation between the attitude towards technology and self-regulated learning behaviour among MOOC learners.

6. To ascertain the correlation between the attitude towards technology and online learning behaviour among MOOC learners.

7. To ascertain the correlation between online learning behaviour and self-regulated learning behaviour among MOOC learners.

Hypothesis of the Study

1. There is no significant difference between the attitude towards technology with respect to the categories of the affective learning experience of MOOC learners.

2. There is no significant difference between self-regulated learning behaviour with respect to the categories of the affective learning experience of MOOC learners.

3. There is no significant difference between online learning behaviour with respect to the categories of the affective learning experience of MOOC learners.

4. There is no significant correlation between attitude towards technology and self-regulated learning behaviour among MOOC learners.

5. There is no significant correlation between attitude towards technology and online learning behaviour among MOOC learners.

6. There is no significant correlation between online learning behaviour and self-regulated learning behaviour among MOOC learners.

Research Methodology

A quantitative approach was adopted in this study. The present research follows the Descriptive method of the Causal Comparative type. A study mainly intends to gather quantitative data to understand a research problem proposed by the researcher for the study. This design emphasized the collection and analysis of quantitative data. The first phase in this study was the collection of data with the help of questionnaires. The second phase was the analysis phase of the study.

In this study, in the first quantitative phase, the researcher collected data from MOOC learners regarding their attitude towards technology, self-regulated learning behaviour, and online learning behaviour. Then the researcher asked the participants to express and share their affective learning experiences based on the MOOC program. After collecting quantitative and qualitative data, in the second phase, the researcher analyzed the qualitative data of affective learning experiences of MOOC learners and categorized the MOOC learners into four categories of affective learning experiences viz., Negative affective learning experiences, Neutral affective learning experiences, Critical affective learning experiences and Positive affective learning experiences. The researcher then statistically analyzed the significant differences in MOOC learner's attitude toward technology, self-regulated learning behaviour and online learning behaviour. Since this research design emphasized quantitative data, the researcher adopted various statistical techniques to analyze the data better.

Sample of the Study

For the study, 56 MOOC learners were selected. MOOC learners belong to the category of students, research scholars and in-service teachers.

Tools used for the study

The quantitative and qualitative tools were used for collecting the data in this study. A quantitative questionnaire was used to measure the attitude towards technology, self-regulated learning behaviour and online learning behaviour among MOOC learners. A qualitative tool was used to understand the learners' affective learning experience based on the MOOC program.

Statistical techniques used for data analysis

In the present study, the following statistical techniques were used.

Descriptive analysis (mean and standard deviation), Inferential analysis (Kruskal-Wallis Test) and Correlation analysis (Pearson's r test) and Linear Regression analysis.

RESULTS AND DISCUSSION

Objective 1

To study the overall affective learning experience of MOOC learners.

Table 1 indicates that the mean (11.70), median (12.00) and mode (12) of the overall scores of the attitude of learners towards technology are in ascending order. The values indicate that the difference between mean, median and mode is marginal. The skewness of students' attitude towards technology is -0.227, and the standard error of skewness is 0.319. The skewness of the scores of distributions is negative. The kurtosis of the distribution is -0.296, and the corresponding standard error is 0.628. The difference between mean, median, and mode and value of skewness and kurtosis are within the acceptable limit range. The distribution of overall scores of the attitude of

Table 1: Descriptive Analysis of the Overall Experience of MOOC Participants

	Attitude towards Technology	Online learning behaviour	Self-regulated learning	Overall Experiences
N	56	56	56	56
Mean	11.70	26.71	20.38	201.32
Std. Error of Mean	0.201	0.318	0.272	2.086
Median	12.00	27.00	20.00	203.00
Mode	12	27[a]	20	20[4a]
Std. Deviation	1.501	2.380	2.032	15.607
Skewness	-0.227	0.135	0.383	0.064
Std. Error of Skewness	0.319	0.319	0.319	0.319
Kurtosis	-0.296	0.144	0.028	0.116
Std. Error of Kurtosis	0.628	0.628	0.628	0.628

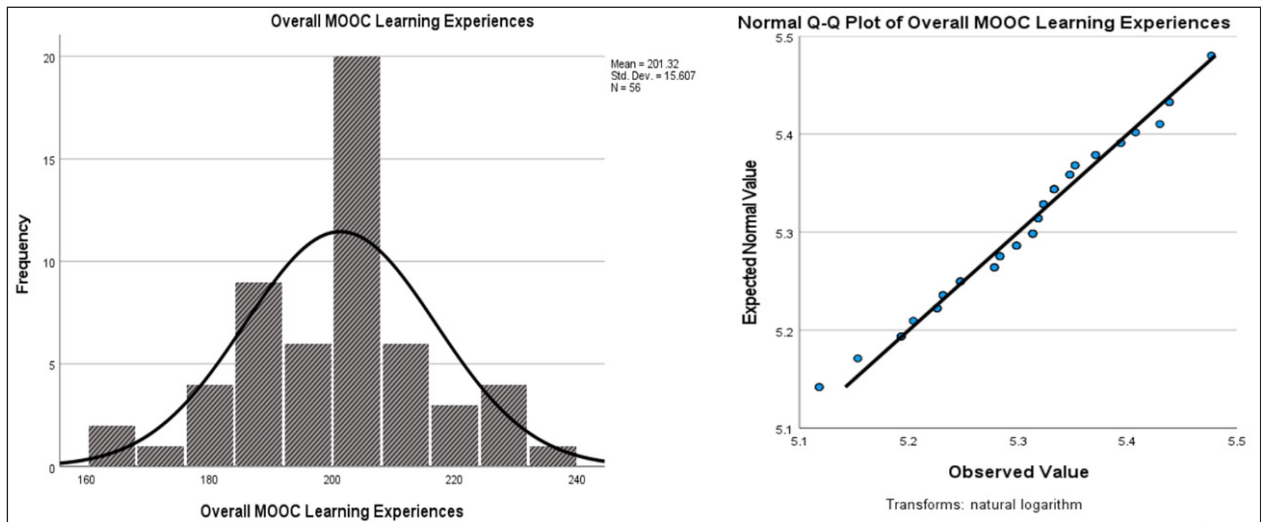*a. Multiple modes exist. The smallest value is shown.*

Fig. 1: Normal distribution of the overall experiences of MOOC learners

learners towards technology among the students is normal.

Mean (26.71), Median (27.00) and Mode (27) of the overall scores of online behaviours are in ascending order. This indicates that the difference between mean, median and mode is marginal. The skewness of the scores of overall scores of online behaviours is 0.135, and the standard error of skewness is 0.319. The skewness of the scores of distributions is positive. The kurtosis of the distribution is 0.144, and the corresponding standard error is 0.628. The difference between mean, median, and mode and value of skewness and kurtosis are within the acceptable limit range. The distribution of overall scores of online behaviour among the students is normal.

Mean (20.38), Median (20.00) and Mode (20) of the overall scores of Self-regulated learning are in descending order. This indicates that the difference between mean, median and mode is marginal. The skewness of self-regulated learning towards technology is 0.383, and the standard error of skewness is 0.319. The skewness of the scores of distributions is positive. The kurtosis of the distribution is 0.028, and the corresponding standard error is 0.628. The difference between mean, median, and mode and value of skewness and kurtosis are within the acceptable limit range. The distribution of self-regulated learning among students is normal.

Mean (201.32), Median (203.00) and Mode (204) of the overall experiences are in ascending order.

This indicates that the difference between mean, median and mode is marginal. The skewness of the scores of overall experiences is 0.064, and the standard error of skewness is 0.319. The skewness of the scores of distributions is positive. The kurtosis of the distribution is 0.116, and the corresponding standard error is 0.628. The difference between mean, median, and mode and value of skewness and kurtosis are within the acceptable limit range. The distribution of overall experiences among the students is normal.

Hypothesis 1

There is no significant difference between attitude towards technology with respect to the categories of the affective learning experience of MOOC learners.

Table 2 indicates that the mean rank of 15.79 for the Negative affective learning experiences group, 21.86 for the Neutral affective learning experiences group, 34.00 for the Critical affective learning experiences group and 36.44 for the Positive affective learning experiences group. The value of the Kruskal-Wallis H test is 15.710, and that was statistically significant at 0.01. Therefore, the null hypothesis was rejected. The pair-wise comparison (Fig. 2) shows the pair-wise significance differences between four different affective learning experience groups.

The Boxplot graph (Fig. 3) reveals that the mean score of the attitude towards technology of four different affective learning experience groups varies. The learners belonging to the negative and neutral affective learning experience group have lower

Table 2: Kruskal-Wallis Test Statistics on Attitude towards technology

Dimension	Categories of Affective learning Experience	N	Mean Rank	Kruskal-Wallis Test	Sig (P-value)
Attitude towards Technology	1. Negative Affective learning experiences Group	12	15.79	15.710	P = 0.01
	2. Neutral Affective learning experiences Group	11	21.86		
	3. Critical Affective learning experiences Group	15	34.00		
	4. Positive Affective learning experiences Group	18	36.44		
	Total	56			

Df = 3.

scores in their attitude towards technology than the critical and positive affective learning experiences group.
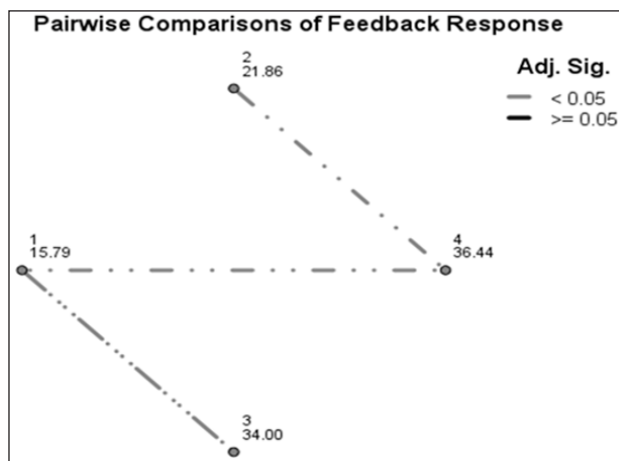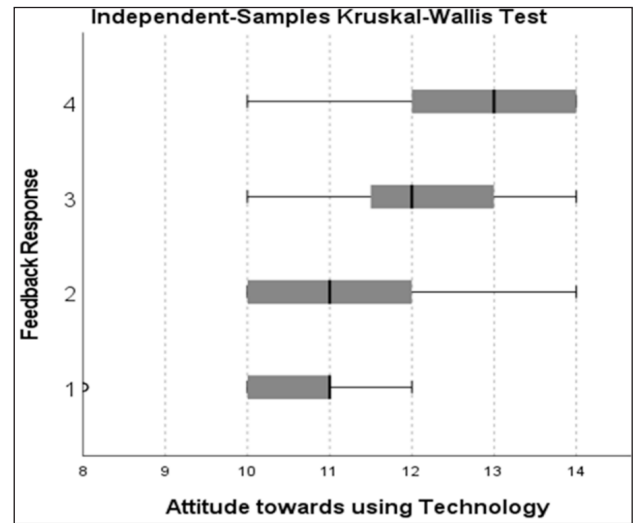

*---- represented pair-wise significant differences between affective experiences groups; 1- Negative affective experiences group; 2- Neutral affective experiences group; 3- Critical affective experiences group; 4- Positive affective experiences group

Fig. 2: Pairwise Significant Differences between Affective Experiences Groups

The plot diagram reveals that there is not much variation in the mean attitude score of negative affective learning experiences groups. The affective learning experiences group belonging to neutral, critical, and positive feedback shows high variation in their mean attitude scores.

The result shows that students' attitude towards technology improves based on their affective learning experience from the MOOC program. It is interpreted that; the critical and positive affective learning experiences group shows higher attitude scores towards technology than the negative and neutral affective learning experiences group. This

result was supported by various previous studies (Kitsantas & Dabbagh 2011).

1- Negative affective experiences group; 2- Neutral affective experiences group; 3- Critical affective experiences group; 4- Positive affective experiences group

Fig. 3: Boxplot diagram showing the Mean score of Attitude towards using Technology among MOOC Learners

Hypothesis 2

There is no significant difference between self-regulated learning behaviour with respect to the categories of the affective learning experience of MOOC learners.
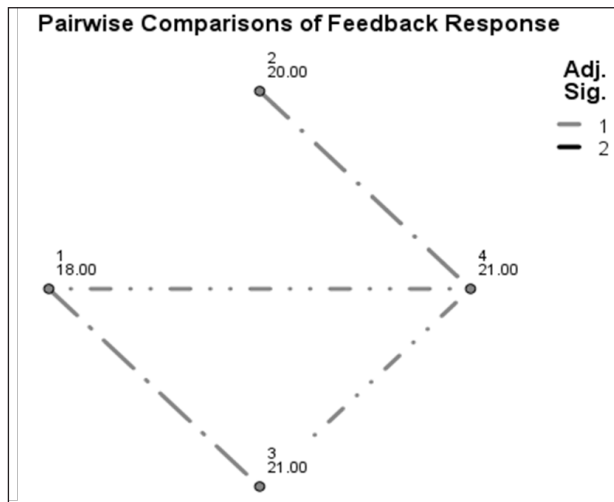
Table 3 indicates the mean rank of 12 for the Negative affective learning experiences group, 23.95 for the Neutral affective learning experiences group, 33.27 for the Critical affective learning experiences group and 36.64 for the Positive affective learning experiences group. The value of the Kruskal-Wallis H test is 21.29, and that was statistically significant

Table 3: Kruskal-Wallis Test Statistics on Self-Regulated Learning Behaviour

Dimension	Categories of Affective learning Experience	N	Mean Rank	Kruskal-Wallis Test	Sig (P-value)
Self-regulated learning	1. Negative Affective learning experiences Group	12	12.00	21.291	P=0.01
	2. Neutral Affective learning experiences Group	11	23.95		
	3. Critical Affective learning experiences Group	15	35.27		
	4. Positive Affective learning experiences Group	18	36.64		
	Total	**56**			

Df = 3.

at 0.01. Therefore, the null hypothesis was rejected. The pair-wise comparison (Fig. 4) shows the pairwise significance differences between four different affective learning experience groups.

*--- represented pair-wise significant differences between affective experiences groups; 1- Negative experiences group; 2- Neutral experiences group; 3- Critical affective experiences group; 4- Positive affective experiences group

Fig. 4: Pairwise Significant Differences between Affective Experiences Groups

The Boxplot graph (Fig. 5) reveals that the mean score of the self-regulated learning behaviour of four different affective learning experience groups varies. Results indicated that the affective learning experiences group belongs to negative and neutral and has lower scores in their self-regulated learning behaviour than the affective learning experiences group, which is critical and positive. The plot diagram reveals that there is not much variation in the mean self-regulated score of the neutral affective learning experiences group.
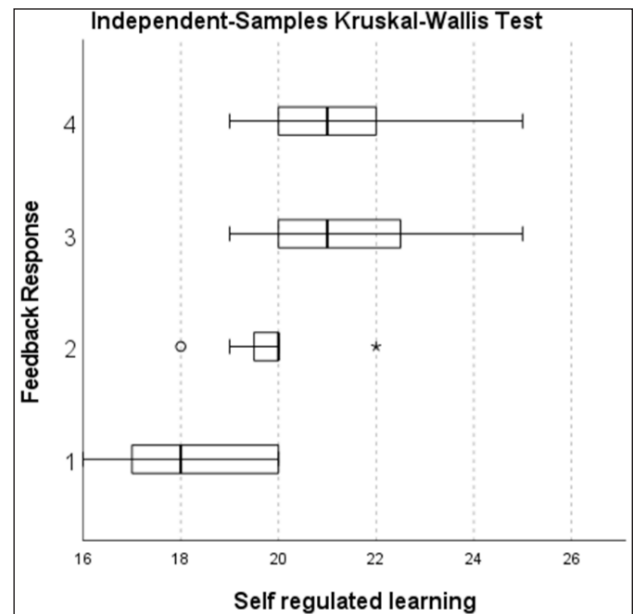
1- Negative affective experiences group; 2- Neutral affective experiences group; 3- Critical affective experiences group; 4- Positive affective experiences group

Fig. 5: Boxplot diagram showing the Mean score of Self-regulated learning behaviour among MOOC Learners

The result shows that the student's self-learning behaviour improves with respect to the enriched experience they received from the MOOC program. In other words, positive or negative experiences obtained from the MOOC program influence self-regulated learning behaviour. According to the findings of the study, MOOCs may significantly increase students' passion for learning by providing them with a self-directed learning environment. The interquartile ranges of the box plot graph showed that the affective learning experience of the neutral and negative group's self-regulated learning experiences is limited. At the same time, critical and

Table 4: Kruskal-Wallis Test Statistics on Online Learning Behaviour

| Dimension	Categories of Affective learning Experience	N	Mean Rank	Kruskal-Wallis Test	Sig (P-value)
Online learning behaviour	1. Negative Affective learning experiences Group	12	13.92	14.829	P=0.01
	2. Neutral Affective learning experiences Group	11	31.18		
	3. Critical Affective learning experiences Group	15	28.33		
	4. Positive Affective learning experiences Group	18	36.72		
	Total	**56**			

Df = 3.

positive experienced affective learning experiences group's self-regulated learning behaviour varied in the broader spectrum. Similar results are found by Zimmerman, B.J. (2000), and Azevedo, R. & Cromley, J.G. (2004).

Hypothesis 3

There is no significant difference between online learning behaviour with respect to the categories of the affective learning experience of MOOC learners.
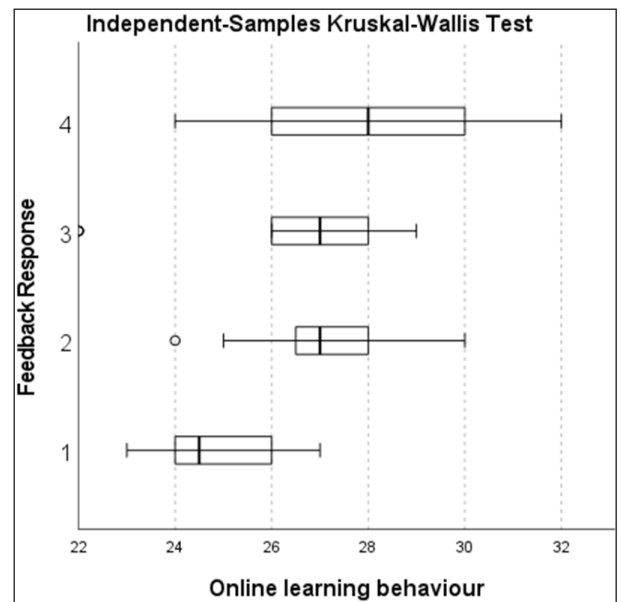
Table 4 indicates that the mean rank of 13.92 for the Negative affective learning experiences group, 31.18 for the Neutral affective learning experiences group, 28.33 for the Critical affective learning experiences group and 36.72 for the Positive affective learning experiences group. The value of the Kruskal-Wallis H test is 14.82, and that was statistically significant at 0.01. Therefore, the null hypothesis was rejected. The pair-wise comparison (Fig. 6) shows the pair-wise significance differences between four different affective learning experience groups.
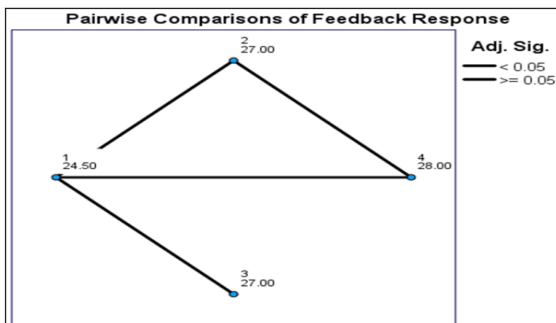
*--- represented pair-wise significant differences between affective experiences groups; 1- Negative affective experiences group; 2- Neutral affective experiences group; 3- Critical affective experiences group; 4- Positive affective experiences group

Fig. 6: Pairwise Significant Differences between Affective Experiences Groups

The Boxplot graph (Fig. 7) reveals that the mean score of the online learning behaviour of four different affective learning experience groups varies. It is revealed that the affective learning experiences group that belongs to negative feedback has lower scores in their online learning behaviour than the affective learning experiences group that belongs to neutral, critical, and positive feedback.

1- Negative affective experiences group; 2- Neutral affective experiences group; 3- Critical affective experiences group; 4- Positive affective experiences group

Fig. 7: Boxplot diagram showing the Mean score of Online Learning behaviour among MOOC Learners

It also reveals that the experience received from the MOOC program influences online learning behaviour. The plot diagram shows a high variation in the mean online learning behaviour score of positive affective learning experiences compared

to negative, neutral, and critical affective learning experiences. The group belonging to neutral, negative, and critical feedback shows low variation in their mean online learning behaviour scores.

The result shows that the student's online learning behaviour improves with respect to positive experiences from the MOOC program. It is interpreted that the positive affective learning experiences group shows higher online learning behaviour compared to the neutral, negative, and critical affective learning experiences group. Similar results are found by Gamage, D., Perera, I. & Fernando, S. (2020).

Hypothesis 4

There is no significant correlation between the attitude towards technology and self-regulated learning behaviour among MOOC learners.

Table 5: Correlation between Attitude towards technology and Self-regulated Learning behaviour

Correlations			
Pearson's r		**Attitude towards technology**	**Self-regulated learning**
Self-regulated learning	Pearson's r	0.694**	—
	Sig. (2-tailed)	0.01	
	N	56	56

**. *Correlation is significant at the 0.01 level (2-tailed).*

The statistical technique used to test this hypothesis is Pearson's *r* (*r*). Table 5 indicates that the '*r*' of attitude score towards technology and self-regulated learning behaviour was 0.694 and is significant at 0.01 levels. Therefore, the null hypothesis was rejected. So, it is concluded that there is a significant relationship between attitude towards technology and self-regulated learning.

Regression Analysis

In regression analysis, the attitude towards technology is used to predict the self-regulated learning behaviour of the learners. The ANOVA analysis indicates the F ratio value is 34.93, and the model is significant at the 0.01 level. This result suggests that learners' attitude towards technology is a good predictor of self-regulated learning behaviour (F (1,54) = 34.936, p = 0.01). The model

summary indicates that 38.2% of the variance in learners' self-regulated learning behaviour can be explained by one's attitude towards technology.

Table 5 (A): The Co-efficient Value

	Coefficient				
Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
1 (Constant)	13.397	1.200		11.166	<.001
Attitude towards Technology	1.615	.273	.627	5.911	<.001

The Coefficient table (Table 5 A) shows the coefficient value as 1.615 and t value as 5.911, and it is significant at 0.01 level (Fig. 8).
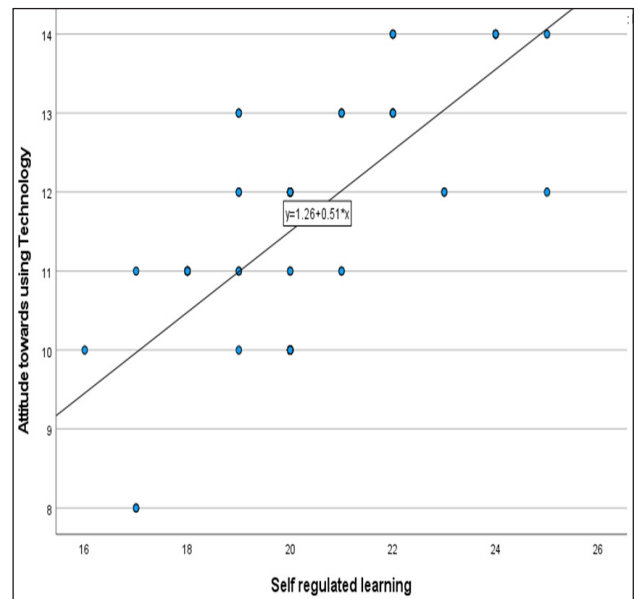

Fig. 8: Regression graph showing the relationship between the mean score of Attitude towards using technology and Self-regulated Learning behaviour of MOOC Learners

Hypothesis 5

There is no significant correlation between attitude towards technology and online learning behaviour among MOOC learners.

The statistical technique used to test this hypothesis is Pearson's *r* (*r*). Table 6 indicates that the '*r*' of attitude score towards technology and online learning behaviour was 0.306 and is significant at 0.05 levels. So, the null hypothesis was rejected.

Table 6: Correlation between Attitude towards technology and Online Learning behaviour

Correlations			
Pearson's *r*		Attitude towards technology	Online Learning behaviour
Online Learning behaviour	Pearson's r	0.306**	--
	Sig. (2-tailed)	0.02	
	N	56	56

**. *Correlation is significant at the 0.05 level (2-tailed).*

Regression Analysis

In regression analysis, the attitude towards technology is used to predict the online learning behaviour of the learners. The ANOVA analysis indicates the F ratio value is 30.696, and the model is significant at the 0.01 level. This result indicated that learners' attitude towards technology is a good predictor of online learning behaviour (F (1,54) = 30.696, $p = 0.01$). The model summary showed that 35.1% of the variance in online learning behaviour of learners could be explained by one's attitude towards technology.

Table 6 (A): The Co-efficient Value

Coefficient						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	18.865	1.440		13.104	<.001
	Attitude towards Technology	1.816	.328	.602	5.540	<.001

The Coefficient table (Table 6 A) shows the coefficient value as 1.816 and t value as 5.540, and it is significant at 0.01 level.

Hypothesis 6

There is no significant correlation between online learning behaviour and self-regulated learning behaviour among MOOC learners.

The statistical technique used to test this hypothesis is Pearson's *r* (*r*). The '*r*' of attitude score towards technology and online learning behaviour was 0.207, and it was not significant at 0.05 levels. So, the null hypothesis was accepted.

Table 7: Correlation between Online Learning behaviour and Online Learning behaviour

Correlations			
Pearson's *r*		Online Learning behaviour	Self-regulated learning behaviour
Self-regulated learning behaviour	Pearson's r	0.207	--
	Sig. (2-tailed)	0.126	
	N	56	56

CONCLUSION

MOOCs have a "massive and open" approach, allowing learners to manage their learning. MOOCs have created a community of self-directed learners. According to the findings of this research, MOOCs may significantly increase students' motivation for learning by providing them with a self-directed educational setting and enhancing their online learning behaviours. According to the findings, learners believe that the learning environment and experience are essential to their classroom success. The affective learning experiences received from the MOOC program significantly play a crucial role in developing their attitude towards technology, which influences self-regulated learning behaviour and online learning behaviour among the participants.

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