Impact of Web 2.0 Tools on Creativity, Collaboration Skills and Self-Regulatory Behaviour among Students

Maheen Zahra Javed
National University of Science and Technology, SEECS, Islamabad Pakistan
Email: Maheenzahra21@gmail.com

Tahira Anwar Lashari
National University of Science and Technology, SEECS, Islamabad Pakistan
Email: Tahira.anwar@seecs.edu.pk

Sana Anwar Lashari
School of Applied Psychology, Social Work and Policy University Utara, Malaysia
Email: Sana.anwar.lashari@uum.edu.my

ABSTRACT

The way students' study, interact, and work together has changed dramatically as a result of Web 2.0 technologies, such as blogs, wikis, social networking sites, and multimedia sharing platforms. This quantitative study investigates the efficacy of two Web 2.0 tools, namely Padlet and Nearpod, vis-à-vis the academic experiences of 11th and 12th graders at Future Learn School. In this study, the Likert-Scale questionnaire was filled out by 100 students and the population size was 282. The responses captured the student's perception on integrating web 2.0 technologies in educational practices. Stata software was used for data analysis, the research applied various statistical methods such as T-Tests, to analyze the collected data. The study provides significant new understandings into how digital technologies support innovative thinking, collaborative skills, and self-regulatory practices among students. It clearly outlines the many effects of Padlet and Nearpod on students' educational experiences, offering a thorough knowledge base that guides suggestions. These suggestions, which focus on the use of Web 2.0 tools to increase the efficacy and efficiency of learning outcomes in secondary school, are directed towards educators and policy makers. This study emphasizes how crucial it is for digital technologies to redefine educational paradigms, and it calls for a methodical and well-informed approach to fully utilizing their potential in educational environments.

Keywords: Creativity, Self-Regulatory Behaviour, Collaboration Skills, Web 2.0 tools, Padlet

INTRODUCTION

The advancement of technology has completely changed the face of education. The traditional approach to teaching that involved chalk-and-board has undergone a transition to a more digital-oriented one. Leading this change is the use of Ed-tech (educational technology) which has transformed the current course of teaching practices.

Educational technology advancement dates back to the use of computers in schools. First of all, the possibilities of using desktop computers opened up new opportunities for interactive learning and teaching approaches, where students could interact with the contents as with ‘‘real’ objects’’. These technological advancements paved the way for a variety of tools and platforms that would possibly improve students' performance (Summak et al., 2010).

Educational technology also implies changes in the physical tools, the instruments as well as the trends in teaching methodologies. Present-day learning theories on learning focus on those that involve the learner and are more skills-based and participatory. Therefore, students get to improve in critical thinking skills and earn better skills in their academics.

The advent of Web 2.0 considerably changed how people used the Internet. Web 2.0, essentially powered by user-generated content and collaborative and interactive web-based tools, further advanced the social nature of the virtual world. This alteration in Web 2.0 radically influenced education and introduced a new generation of tools called Web 2.0 tools. Web 2.0 tools are online programs and sites whereby users can create, communicate and interact with content in real-time. The emerging tools differ from those predecessors as they promote collaboration whereby individuals can be part and parcel of information generation and sharing (Majid & Verma, 2021). Examples include social networking sites, collaborative document editors, and interactive presentation software.

Web 2.0 integration in education has created new opportunities for teachers and learners. All these instruments favour interpersonal learning, encourage active involvement and facilitate creative development. Understanding the broader context of their evolution in educational technology is required to analyze the impact of specific Web 2.0 platforms, including Padlet and Nearpod (Williams & Chinn, 2009).

Nonetheless, educational technology has continued to grow and become integrated with classrooms, but there is little knowledge of the effects of Web 2.0 tools, including Nearpod and Padlet, on students' creativity, collaboration skills, and self-regulatory behaviour. Even though there exist countless works devoted to the generally positive influence of Ed-tech, there is a lack of research on ways these engaging tools shape various learning contexts. Filling this gap is important for educators and policymakers to get a better understanding of the use of Web 2.0 tools (Suluai-Mahuka, 2022).

Significance of the Study

Technology is important in Education in the 21st Century. Technological advancement extends to social life, making education stakeholders embrace the use of these technologies as they improve the experiences of learning. Technology in the form of the internet and advanced gadgets has changed the way students approach learning and course materials (Caliskan et al., 2019). Therefore, the awareness of the impact that technology has on education has emerged as an area of interest, which makes this study essential.

This paper analyzes the effects of Web 2. 0 tools, including Padlet and Nearpod, regarding learning outcomes. Incorporation of such tools to the educational process is a way modern approach to teaching is trying to revolutionize student learning. This research adds to the body of knowledge by exploring how these tools influence creativity, collaborative abilities, and self-regulation which enhances the link between technology enhancements and teach-learning nexus.

The study benefits educators, as it offers direction on how to use Web 2.0 adopted by educators in their teaching processes, thus improving the students' attentiveness and effectiveness of learning. For administrators, it provides best practices when integrating any technological tool in teaching and learning environments, to guarantee that expenditures made in Ed-tech are worth it. Therefore, the findings of the research can be used to introduce policies as to the comprehensive approaches to education with employing technologies as necessary and sufficient demands of the contemporary world. Thus, understanding these tools' effects can help to develop an effective educational environment that will prepare students for future life.

Research Objectives

The research objectives of the study are the following:

- To find out the impact of Web 2.0 tools on the creativity of students.
- To find out the effects of Web 2.0 tools on the collaboration skills of students.
- To find out the impact of Web 2.0 tools on the self-regulatory behaviour of students.

Research Questions

- What impact do tools like Web 2.0 have on the creativity of students?
- What are the effects that these tools have on collaboration?
- How do the students think Web 2.0 tools have changed self-regulatory behaviour?

Hypotheses

- The Web 2. 0 tools help to increase the level of creativity.
- Web 2.0 tools empower sharing and collaborative qualities.
- Application of the Web 2.0 tools promotes self-regulation behaviour.

LITERATURE REVIEW

Since the introduction of educational technology, this field has undergone dynamic transformations, revolutionizing the world of teaching and learning. Audiovisual aids such as projectors and filmstrips were introduced at the beginning of the 20th century, indicating early steps towards improving classroom teaching using multimedia (Hursen, 2021). Then, educational television came in the middle of the 20th century, represented by programs like Sesame Street that demonstrated how technology could be used in early childhood education (Kearney & Levine, 2019).

In the late 20th century, a significant development occurred after personal computers became widely used in educational institutions. This modification gave students a direct data source, thus, an interactive learning era. The Internet revolutionized E-Technology by introducing worldwide inter-connectivity and access to vast knowledge databases (Bulman & Fairlie, 2016).

Major technological breakthroughs include the inclusion of multimedia components in educational software as symbolized by CD-ROM and early internet products (Shunkov et al., 2022). The advent of the 21st century saw the emergence of mobile learning due to the nature of smartphones and tablets that enabled learning anywhere and anytime, which changed not only the nature of the classroom but also the learners' habits.

Regarding pedagogy and instructional design, educational technology has changed the paradigm from teacher-centered to learner-centered. This transfiguration is evident in virtual classrooms, online forums, and collaborative tools. The impact on instructional design models is visible with current models such as ADDIE and SAM, incorporating digital elements and focusing on learner involvement, feedback, and adaptive learning (Jung et al., 2019).

Mixed learning that combines face-to-face instruction and online elements has emerged as a significant trend, acknowledging the individualized needs of learners and capitalizing on technology for a more personalized learning approach.

Theory of Critical Thinking by John Dewey

John Dewey spotlighted the significance of critical and active thinking in his theory of critical thinking in the learning process. Based on the theory, critical thinking involves reviewing the idea, digging deep into alternative perspectives, and engaging in non-judgmental research that is objective (Williams, 2017). He advocated learning that facilitated problem-solving, decision-making, and the application of knowledge in real-world settings, so it needs to be manifested similarly (Holdo, 2023). This theory emphasizes the importance of an inquiring mind and the ability to analyze complex situations that can lead to wonders.

Self-Regulation Learning Theory by Zimmerman

Zimmerman came up with a perspective on which students' ability to control cognitive, motivational, and behavioural processes to achieve learning goals is considered under the theory of Self-Regulation Learning (Zimmerman & Schunk, 2011). This theory includes fundamental tenets of self-management, goal setting, time management, and self-esteem. Zimmerman emphasizes the cyclical nature of self-regulation, in which students continually evaluate their progress, adjust their strategies, and maintain their self-efficacy, thus reviewing their thinking and performing pre and post-reflection (Schunk, & Zimmerman, 2012). This theory focuses on the role of meta-cognition in practical learning and the importance of students taking responsibility for their learning experiences.

Collaborative Learning Theory by Kenneth Bruffee

Kenneth Bruffee's collaborative learning theory spotlights the social construction of knowledge through interaction with peers (Bruffee, 1999). He argued that learning is a collaborative process in which people actively participate in conversations, agree on meaning, and come to an understanding together, thus the collaboration. This theory supports the idea that learning is not an individual effort but a collective effort that draws on different perspectives and collaborative research, and students need to engage in learning experiences mutually (Bruffee, 2003).

Technology Acceptance Model by Fred Davis

Fred Davis's Technology Acceptance Model (TAM) focuses on individual technology acceptance in their activities. Perceived ease of use is assumed to be an essential factor in people's acceptance of technology (Venkatesh & Davis, 2000). TAM highlights the role of attitudes, subjective norms, and perceived behavioural controls in shaping users' intentions to use technology. This model has been widely applied to understand how users adopt various skills, including pedagogical tools, and it fits here as Web 2.0 tool usage in the classroom considers the acceptance level of learners.

Theoretical Framework

The theoretical basis of this paper is the interplay of these four theories to examine the impact of web 2.0 tools, specifically Padlet and Nearpod, on promoting critical thinking, behavioural self-regulation, and collaborative learning in educational settings. This concept recognizes the role of technology in shaping the learning experience and the dynamic relationship between personal and social factors. More importantly, this concept supports Dewey's critical thinking theory and emphasizes the need for active inquiry, knowledge, and open-mindedness to

develop critical thinking skills. Zimmerman's self-regulated learning theory provides insight into the student's ability to self-manage cognitive processes, set goals, manage time, and track progress, which is also the focus of this study. Bruffee's collaborative learning theory emphasizes the importance of social interaction and shared knowledge formation, especially in the context of collaborative activities led by Padlet and Nearpod. This can be considered here as the end goal of Padlet and Nearpod usage can also be collaboration. Finally, Davis's technology acceptance model allows the adoption and integration of Padlet and Nearpod as a technology tool while respecting students' ideas about usability and ease of use and fits the context. This combination of theories provides an essential framework for examining how the Padlet and Nearpod interactive video platform impacts critical thinking, self-regulation, and collaborative learning among learners in Pakistan. The framework examines this issue in the context of Padlet and Nearpod, considering the cognitive, social, and technological factors that shape learning experiences and outcomes that can be studied in-depth using the chosen model.

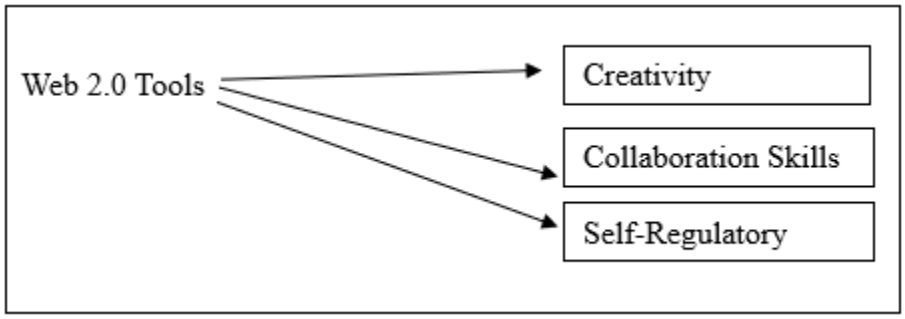

Figure 1 Relationship among variables

Combining these perspectives provides a unique and comprehensive understanding of the impact of Web 2.0 tools on student learning and self-determination, identifying cognitive processes underlying critical thinking, processes of cognitive self-determination, tools in collaborative learning in the changing landscape, and the role of technology in education. The critical thinking process highlights active thinking and reflection, which are essential in understanding the effects of Web 2.0 tools on the learning process. It offers insights into how these tools make students inquire, analyze and organize data to formulate opinions that impact learning. This integrated theoretical framework is crucial as this study is geared toward the influence of Web 2.0 tools. Incorporating collaborative learning into a technology adoption framework correlates with the nature of Web 2.0 applications that are interactive and immersive, featuring interactive content and user activities. This theoretical framework purports that incorporating critical thinking, autonomy, collaborative learning, and technology adaptation leads to holistic autonomous Web 2.0 learner behaviour. It will enable the researcher to study the interplay of cognitive processes, social interactions, technological resources, and the individual and the social element.

METHODOLOGY

Research Design

Opting for the quantitative methodology is rooted in the fact that the questions asked require empirical data in a numeric form, which would allow for the conclusions to be drawn in a statistically significant manner (Bloomfield & Fisher, 2019). The effects of Web 2.0 tools,

including Padlet and Nearpod, in terms of creativity, collaborative skills and self-regulation were quantitatively measured in the study. This approach allows the collecting of structured data through a questionnaire with a Likert scale that provides quantifiable information about participants' attitudes.

Target Population

The target population is the 482 11th and 12th-grade pupils attending Future Learn School in Pakistan. This means that the research was a case of the students who were the subjects of the inquiry, a cohort of a target population whose response to the Padlet and Nearpod implementation was investigated. The particular focus was on the student demographic of the college level, which characterizes a cohort that differs in their academic achievement.

Sample Size

The study included participants with a sample size that was a product of the reasonable consideration of several factors. Considering attention to statistical reliability and validity, a sample size of 100 participants was sufficient. The sample size was chosen considering not only its practical aspects but also its methodological ones.

Sampling Technique

The study used a random sampling procedure for participant selection. Random sampling is a basic procedure that guarantees that each member of the target populace has an equivalent and unbiased chance of getting into the example. This method is precious in reducing selection bias and increasing the validity of study results (Endo et al., 2016).

Data Collection

The primary data was collected through a questionnaire. The basis of the questionnaire was that the development process used Web 2.0 tools, which were selected with great care. Padlet and Nearpod were chosen because the mentioned platforms are universal and widespread in educational environments. Their characteristics, including collaboration, interactivity, and content creation, match the attention of the study, which is centered on creativity, collaborative skills, and self-regulatory behaviour.

Items of the questionnaire were carefully formulated to measure participants' perceptions of the effect of Padlet and Nearpod on creativity, collaborative skills, and self-regulation. Each construct was decomposed into specific items aimed at collecting refined information. The Likert-scale items were used to evaluate the respondents' agreement or disagreement with statements about how these tools affect different aspects of their academic life.

Data Analysis

Descriptive Statistics

Descriptive statistics, for instance, the mean, median, and mode, were central in summing up the central tendencies of respondents' perception of the influence of Padlet and Nearpod on creativity, group work skills, and self-regulatory performance. These measures gave an excellent general overview of the data, focusing on the mean, median and most prevalent response.

Frequency Distributions

A detailed breakdown of participants' responses to each questionnaire item was presented in frequency distributions. This approach supports a better understanding of distribution patterns and participant perspective variants.

Inferential Statistics

T-tests determined significant differences in the mean scores regarding creativity, collaborative skills, and self-regulatory behaviour. Paired t-tests compared the means of variables after the Padlet and Nearpod implementation to understand the effect of these tools on the achievement of the targeted educational outcomes (Mishra et al., 2019). The significance level was set to determine the strength of the observed differences, which increased the reliability of the statistical analysis.

ANALYSIS AND DISCUSSION

Sample Characteristics

Table 1 Gender Participation of the respondents

Gender	Freq.	Percent	Cum.
Male	59	59.00	59.00
Female	41	41.00	100.00
Total	100	100.00	

The sample description shows that the study involved 100 individuals, whose distribution was based on gender. 59% of the respondents were male, while 41% were female. This distribution represents a gender-sensitive sample that enables an in-depth analysis of the influence of Web 2.0 technologies on the student's learning trajectory and self-regulatory behaviour in Pakistani classrooms.

Descriptive Statistics

Table 2 Summary Statistics of Creativity Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Creativity1	100	3.95	.8689364	2	5
Creativity2	100	3.93	.8791065	2	5
Creativity3	100	3.86	.8764022	2	5
Creativity4	100	4.1	.8703883	2	5
Creativity5	100	3.87	.8836906	2	5

The analysis of creativity variables provides some fascinating information about the participants' perceptions regarding the effect of Web 2.0 tools on academic creativity. On average, there was a moderate agreement among the participants in the five statements relating to creativity. The mean score for "My creativity for classroom activity positively affects the use of Web 2.0 tools" (Creativity1) was 3.95, suggesting an agreement mean. Interestingly, "I often use 2.0 Web

tools to show my creativity in academic tasks" (Creativity4) got a higher mean score of 4.1, indicating a more substantial agreement regarding the frequency of using Web 2.0 tools for creative expression.

All creativity variables had standard deviations between 0.8689364 and 0.8836906, showing some variation in the answers among the participants. This variability implies that people have different views and also experiences of the impact of Web 2.0 tools on academic creativity. Interestingly, the minimum and maximum values for every variable stayed within the range of 2 to 5, meaning that all the participants responded consistently. Therefore, despite the positive influence of Web 2.0 tools on creative thinking and the participants' satisfaction with generating innovative ideas, there is a clear divergence in responses.

Table 3 Summary statistics of Collaboration Skills Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Collaborat~1	100	3.7	.9374369	1	5
Collaborat~2	100	3.9	.7849596	2	5
Collaborat~4	100	3.92	.8125282	2	5
Collaborat~5	100	3.97	.9369519	2	5
Collaborat~3	100	3.68	.9415225	2	5

The quantitative summary of collaboration skills variables provides meaningful insights into the participants' perceptions about how Web 2.0 tools affect their collaborative experiences in academic settings. The respondents have been very optimistic in all five statements concerning the collaboration, with mean scores from 3.7 to 3.97. These scores indicate a general acceptance of the very positive impact of Web 2.0 tools on collaboration skills.

The score for the statement "The use of Web 2.0 tools positively affects my teamwork abilities in academic group projects" (Collaboration1) was 3.7, which is a moderate amount of agreement. Participants approved of the impact on group projects and shared a more excellent mean score of 3.97 with an agreement to the statement, "I frequently use Web20 tools. This implies a tendency to use Web 2.0 tools for collaborative activities in the classroom setting.

The standard deviations of the collaboration variables were between 0.7849596 and 0.9374369, suggesting some variation in the responses. Although the participants as a whole endorsed positive reports of how Web 2.0 tools influenced their collaboration skills, there is a variation in the individual perceptions.

The Likert-scale data for these collaboration statements show a continuous pattern of agreement. Web 2.0 tools, likely to be recommended by the participants for promoting collaboration in group projects in higher education (Collaboration5), have a mean score of 3.92. This further implies a widespread acceptance that these tools can positively enhance collaborative practices. Thus, the results indicate that the participants view Web 2.0 tools as positively affecting their collaboration abilities in different academic situations. These insights offer essential information about technologically facilitated communal learning in Pakistani classrooms, establishing the basis for researching aspects supporting positive perceptions and their pedagogical implications.

Table 4 Summary statistics of Self-Regulatory Behaviors Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
SelfRegula~1	100	3.97	.8698659	2	5
SelfRegula~2	100	4	.8645662	2	5
SelfRegula~3	100	3.83	.9645745	2	5
SelfRegula~4	100	4.05	.8804843	2	5
SelfRegula~5	100	3.91	.9	2	5

Analyzing variables associated with self-regulatory behaviour allows the researcher to understand how Web 2.0 tools affect the participants' perceptions regarding managing academic activities and regulating learning and progression. The five self-regulatory behaviour statements had mean scores of 3.83 to 4.05, indicating a positive attitude towards the impact of Web 2 tools in general. Regarding the SelfRegulatory1 statement, "The use of Web 2.0 tools has a positive effect on my self-regulative behaviour for academic tasks," participants gave an average mean score of 3.97, indicating moderate agreement. Likewise, "I regularly employ Web 2.0 tools to manage my learning and academic progress" (SelfRegulatory4) obtained 4.05 mean scores. The variability in the responses of the self-regulatory behaviour variables was from 0.8645662 to 0.9645745 standard deviations. While the average participant reported positive perceptions of the self-regulation behaviour of Web 2.0 tools, the responses at an individual level vary.

Participants also showed very favourable perceptions about the impact of Web 2.0 tools on time management and resource use for academic tasks. The statement "The positive influence of using Web 2.0 tools on my ability to use the time and resources for academic assignments" (SelfRegulatory2) has a mean score of 4.00, which means a firm agreement. On the satisfaction with self-regulatory behaviour when using Web 2.0 tools in an academic setting, the participants had a mean score of 3.83 for the statement "I am satisfied with my self-regulatory behaviour while using Web 2.0 tools in an academic setting" (SelfRegulatory3), showing a positive attitude overall. Therefore, the results indicate that the participants consider Web 2.0 tools to influence their self-regulatory behaviour in different academic activities positively.

Scale Reliability

Table 5 Scale reliability of Creativity Variable

Test scale = mean(unstandardized items)	
Average inter-item covariance:	.3823131
Number of items in the scale:	5
Scale reliability coefficient:	0.8325

The alpha reliability analysis was performed on the five creativity variables (Creativity1, Creativity2, Creativity3, Creativity4, and Creativity5) to test internal consistency and scale reliability. The average inter-item covariance, the average correlation between the pairs of items, was determined to be 0.3823. This suggests a moderate relationship between the creativity variables. The alpha coefficient, an index of internal consistency, was determined to be 0.8325. The alpha coefficient measures the scale’s reliability, and the values closer to unity indicate a more significant internal consistency. In this regard, the alpha coefficient of 0.8325 obtained from such

results indicates a high level of reliability for the creativity scale. This shows that the five creativity constructs form a coherent and internally consistent factor related to the students' perceptions of Web 2.0 tools on their creativity in academic tasks. (Yang & Green 2011).

Table 6 Scale reliability of the Collaboration Skills Variable

Test scale = mean(unstandardized items)	
Average inter-item covariance:	.3727677
Number of items in the scale:	5
Scale reliability coefficient:	0.8193

The alpha reliability analysis of the five collaboration skills variables (CollaborationSkills1, CollaborationSkills2, CollaborationSkills3, CollaborationSkills4, and CollaborationSkills5) was done to measure the internal consistency and reliability of the scale. The average inter-item covariance that shows the average correlation between two items was calculated to be 0.3728. This shows a moderate level of relationship among the variables associated with the collaboration skills. The alpha coefficient, an essential indicator of the scale's internal consistency, was 0.8193. The alpha coefficient reflects the scale reliability, where the values approaching 1 indicate a more significant internal consistency. In this regard, the observed alpha coefficient of 0.8193 implies high reliability for the scale of collaboration skills. This implies that the five variables of collaboration skills are a coherent and internally consistent construct reflecting how the students perceive Web 2.0 tools as influencing their' collaborative skills in academic environments.

Table 7 Scale Reliability of Self-Regulatory Behavior Variable

Test scale = mean(unstandardized	items)
Average inter-item covariance:	.4051919
Number of items in the scale:	5
Scale reliability coefficient:	0.8355

The alpha reliability analysis was performed on the five self-regulatory behaviour variables (SelfRegulatory1, SelfRegulatory2, SelfRegulatory3, SelfRegulatory4, and also SelfRegulatory5) to determine how consistent and reliable the scale is. This average inter-item covariance, the average correlation between all pairs of items, was calculated to be 0.4052. This means that the correlation between self-regulatory behaviour variables is moderate. The alpha coefficient, an essential indicator of internal consistency, was found to be 0.8355. The alpha coefficient of 0.8355 indicates a high level of scale reliability for self-regulatory behaviour. This means that the five self-regulatory behaviour variables assessed a unified and homogeneous construct of the students' perceptions of how Web 2.0 tools affect their self-regulatory behaviour during academic tasks.

Table 8 Impact of Creativity and Collaboration Skills on Self-Regulatory

Source	SS	df	MS	Number of obs	=	100
				F(2, 97)	=	29.71
Model	18.9423033	2	9.47115164	Prob > F	=	0.0000
Residual	30.9212967	97	.318776255	R-squared	=	0.3799
				Adj R-squared	=	0.3671
Total	49.8636	99	.503672727	Root MSE	=	.5646

SelfRegulatory	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Creativity	.6385094	.082847	7.71	0.000	.474081	.8029378
CollaborationSkills	.0236748	.0830411	0.29	0.776	-.1411387	.1884884
_cons	1.346797	.4741125	2.84	0.005	.4058147	2.287779

The above regression analysis seeks to determine the relationship between Creativity and Collaboration Skills on Self-Regulatory behaviours. The model is statistically significant (F(2, 97) = 29. 71, p < 0. 001) with an R-squared of 0. 3799, indicating that 37.99% of the variation in Self-Regulatory behaviours can be accounted for by the predictors. Creativity has a strong positive relationship with Self-Regulatory behaviours (Coef = 0. 6385, p < 0. 001), while Collaboration Skills do not correlate (Coef = 0. 0237, p = 0. 776). The intercept (_cons) is 1.34.

Table 9 Effect of Self-regulatory and Collaboration on Creativity

Source	SS	df	MS	Number of obs	=	100
				F(2, 97)	=	29.95
Model	17.7880115	2	8.89400573	Prob > F	=	0.0000
Residual	28.8050885	97	.296959676	R-squared	=	0.3818
				Adj R-squared	=	0.3690
Total	46.5931	99	.470637374	Root MSE	=	.54494

Creativity	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
CollaborationSkills	-.049218	.0800268	-0.62	0.540	-.2080491	.1096131
SelfRegulatory	.5948108	.0771771	7.71	0.000	.4416356	.747986
_cons	1.782152	.4405403	4.05	0.000	.9078017	2.656503

The above regression analysis aims to examine the effect of Collaboration Skills and Self-Regulatory behaviours on Creativity. The model is statistically highly significant (F(2, 97) = 29. 95, p < 0. 001) with an R-squared of 0. 3818, indicating that 38.18% of the variance in Creativity. The findings indicate that Self-Regulatory behaviours have a positive and significant effect on Creativity (Coef = 0. 5948, p < 0. 001), while Collaboration Skills have no significant effect (Coef = -0. 0492, p = 0. 540). The intercept (_cons) is 1. 7822, also significant (p < 0. 001).

Table 10 Mean comparison impact of web 2.0 tools on Creativity and Collaboration Skills

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. ttest Creativity == CollaborationSkills

Paired t test
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Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Creati~y	100	3.946333	.068603	.6860302	3.81021	4.082457
Collab~s	100	3.862	.0684427	.6844271	3.726195	3.997805
diff	100	.0843333	.0996069	.9960692	-.1133084	.2819751

```
    mean(diff) = mean(Creativity - CollaborationS~s)              t =   0.8467
Ho: mean(diff) = 0                                     degrees of freedom =       99

 Ha: mean(diff) < 0           Ha: mean(diff) != 0           Ha: mean(diff) > 0
 Pr(T < t) = 0.8004         Pr(|T| > |t|) = 0.3992          Pr(T > t) = 0.1996
```

A paired t-test was used to test for potential variations in the perceived effect of Web 2.0 tools on Creativity and Collaboration skills among participants. The average score for creativity was 3.946, while the mean score for Collaboration Skills was 3.862. The mean difference for the factor (Creativity – Collaboration Skills) was 0.0843. Nevertheless, the t-statistic of 0.8467 did not reach statistical significance with a p-value of 0.8004, above the standard significance level of 5%. From these findings, the evidence to reject the null hypothesis is insufficient. This implies that participants did not feel a notable difference in the influence of Web 2.0 tools on creativity compared to Collaboration Skills. These results suggest that, as the respondents see it, these two variables were equally affected using Web 2.0 tools.

Table 11 Mean comparison impact of web 2.0 tools on Creativity and Self-Regulatory Behaviour

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. ttest Creativity == SelfRegulatory

Paired t test
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Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Creati~y	100	3.946333	.068603	.6860302	3.81021	4.082457
SelfRe~y	100	3.958	.0709699	.709699	3.81718	4.09882
diff	100	-.0116667	.0612008	.6120081	-.1331023	.109769

```
    mean(diff) = mean(Creativity - SelfRegulatory)                t =  -0.1906
Ho: mean(diff) = 0                                     degrees of freedom =       99

 Ha: mean(diff) < 0           Ha: mean(diff) != 0           Ha: mean(diff) > 0
 Pr(T < t) = 0.4246         Pr(|T| > |t|) = 0.8492          Pr(T > t) = 0.5754
```

The paired t-test was used to evaluate whether there were any differences in the perceived impact of Web 2.0 tools on Creativity and Self-Regulatory Behavior among the participants. The average score for creativity was 3.946, and the mean score for Self-Regulatory Behavior was 3.958. The estimated difference (Creativity – Self-Regulatory) was -0.0117. On the contrary, the t-statistic of -0.1906 did not achieve statistical significance as its p-value was 0.4246, way above the standard level of 0.05. Based on these findings, there is insufficient evidence to reject the null hypothesis. This implies that the participants did not find a noticeable difference in Web 2.0 tools under Creativity and Self-Regulatory Behavior. The results suggest that, from the standpoint of respondents, these two variables were equally affected by the use of Web 2.0 tools.

Table 12 Mean comparison impact of web 2.0 tools on Collaboration Skills and Self-Regulatory Behaviour

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. ttest CollaborationSkills == SelfRegulatory

Paired t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Collab~s	100	3.862	.0684427	.6844271	3.726195	3.997805
SelfRe~y	100	3.958	.0709699	.709699	3.81718	4.09882
diff	100	-.096	.0991878	.9918781	-.2928101	.1008101

```
    mean(diff) = mean(CollaborationS~s - SelfRegulatory)         t =  -0.9679
Ho: mean(diff) = 0                                     degrees of freedom =       99

 Ha: mean(diff) < 0           Ha: mean(diff) != 0           Ha: mean(diff) > 0
 Pr(T < t) = 0.1677         Pr(|T| > |t|) = 0.3355          Pr(T > t) = 0.8323
```

To test the potential differences in the Perceived Impact of Web 2.0 tools on Collaboration Skills and Self-Regulatory Behavior, a t-test was performed with an alpha level set at 0.5 per cent (5%). The average score for Collaboration Skills was 3.862, and the average for Self-Regulatory Behavior was 3.958. The calculated mean difference (Collaboration Skills – Self-Regulatory) was -0.096. On the other hand, a t-statistic of -0.9679 failed to attain statistical significance, with p being 0.3355, which is higher than the threshold level of 0.05. Consequently, given the findings, insufficient evidence is available to refute the null hypothesis. This means that the respondents did not feel a drastic change in the effect of Web 2.0 tools on Collaboration Skills and Self-Regulatory Behavior. According to the study, these two variables were equally impacted from respondents' point of view using Web 2.0 tools.

CONCLUSION

In conclusion, analyzing participants' opinions about creativity-related statements, including generating innovative ideas, demonstrating creativity in one's project work, and recommending Web 2.0 tools for promoting creative ideas, represents a favourable attitude. Mainly, a significantly high percentage of the participants were satisfied and agreed that these tools positively influenced their thinking. The mean scores for creativity-related variables were high and

consistent, which proves that students' creative works performed better with the help of these Web 2.0 tools.

Similarly, Web 2.0 tools on collaboration skills were measured using student responses to statements such as group project collaboration, peer influence during academic assignments, satisfaction with collaborative experiences, and recommending these tools to promote collaboration. The data showed the participant a positive perception, as the majority agreed that Web 2.0 tools positively impacted their collaboration skills. The results of the mean scores for collaboration-related variables indicate that with the help of these tools, students' collaborative efforts are amplified considerably.

The preferred statement is that the effect of Web 2.0 tools on self-regulatory behaviour in terms of controlling time and resources used for academic activities, satisfaction with self-regulatory behaviour, frequent application of these tools to regulate learning and academic performance, and suggesting its use for improving self-regulatory behaviour reflects a positive trend. Overall, the study revealed that people agree that these tools contribute positively to self-regulatory behaviour. Mean scores for variables related to self-regulatory behaviour were generally high, indicating that Web 2.0 tools positively contribute to students' self-regulation when using them in an academic setting.

No significant fact emerged in comparing Web 2.0 impact statistics between creativity, collaborative skills and self-regulatory behaviour. The t-tests did not reveal statistically significant differences in the means on these three aspects, which suggests that, according to the participants, the influence of Web 2.0 tools is relatively stable and similarly affects creativity levels, collaboration skills, and self-regulated learning behaviour. Therefore, the analysis results demonstrate that interaction using Padlet and Nearpod can positively and consistently increase students' creativity levels, collaboration skills, and self-regulatory behaviour when doing their academic assignments. The positive sentiments expressed by the members of the groups regarding each of the dimensions reveal the potential of such digital tools to enhance various facets of the learning mechanism.

RECOMMENDATIONS

Based on the findings derived from the analysis of the impact of Web 2.0 tools, particularly Padlet and Nearpod, on students' creativity, collaboration skills, and self-regulatory behaviour, the following specific recommendations can be made to educators, institutions, and educational practitioners:

- Encourage using Padlet and Nearpod as examples of Web 2.0 tools that can be integrated into their practice. Provide the educators with training and professional development on using these tools to promote student creativity, collaboration and self-regulation.
- Accentuate the collective nature of Web 2.0 tools by developing a more engaging session for the students. Incentivize the utilization of these tools to enable group work, collaborations and activities that need teamwork. This can create teamwork among the students and a learning atmosphere of thrill.
- Focus on the creative use of Web 2.0 tools in the classroom settings. Provide examples and cases of when these instruments have been used effectively to initiate creative thinking, innovative ideas, and the development of creativity in various academic tasks.

- Train students to apply suitable time management and self-regulation using Web 2.0 tools. Teach the students functions that may be useful to organize work, manage resources, and track the learning processes using these tools. Encourage the formation of personal strategies about how one uses these tools to regulate oneself.
- Encourage a broader range of Web 2.0 tools to be used other than Padlet and Nearpod. Different tools can be equipped with features for facilitating creativity, collaboration, or self-regulation. Using a wide selection of tools guarantees flexibility and adequately meets various approaches to learning.

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