KeAi
CHINESE ROOTS
GLOBAL IMPACT

International Journal of Innovation Studies

INVESTIGATION INTO THE DIGITAL HORIZON: IMPROVING STUDENT-CENTERED EDUCATION THROUGH TECHNOLOGY WITH SPECIFIC REFERENCE TO KASARAGOD DISTRICT

Dr. Ponni C K
Faculty
Department of Management Studies, Email: ponni@cukerala.ac.in
Central University Of Kerala, Periya, Kasaragod-671320, India

Dr. Arvind.R.Gajakosh
Associate Professor
Department of Management Studies Email: arvind.gajakosh@cukerala.ac.in
Central University Of Kerala, Periya, Kasaragod-671320, India

Abstract

This study investigates the transformative potential of technology in education, particularly focusing on student-centered approaches within Kasaragod District. It emphasizes transitioning from traditional teaching methods to ones that prioritize students' active participation, critical thinking, and personalized learning paths through digital tools. Recognizing a gap in understanding technology's impact on student engagement and outcomes, the research aims to assess how effectively technology is integrated into educational practices, teacher proficiency in digital tools, and students' access to technology. The methodology includes a descriptive research design with a structured questionnaire targeting 127 students from various academic disciplines, to gather insights on technology's role in enhancing learning experiences. Findings indicate moderate satisfaction with current technology integration and digital proficiency among teachers but highlight significant opportunities for improvement in student engagement with technology. The study suggests prioritizing professional development in digital skills, ensuring equitable access to technological resources, and incorporating technology-driven learning activities to enhance student-centered education. By addressing these areas, educational stakeholders in Kasaragod District can harness technology's full potential to enrich student learning, suggesting a strategic path towards a more interactive, effective, and personalized educational landscape through technology empowerment.

Keywords: Digital Education, Student Engagement, Technology Integration, Kasaragod District, Pedagogical Innovation

INTRODUCTION

The education system is undergoing a revolution driven by technology. This study explores how technology can improve student-centered learning. Traditionally, education has been teacher- centered, with instructors delivering knowledge and students passively receiving it.

However, this approach limits critical thinking, creativity, and personalized learning. Student-centered education flips this script, putting students at the heart of the learning process. Here, students actively participate and take ownership of their educational journey, leading to deeper understanding, engagement, and the development of crucial 21st-century skills.

Technology offers exciting possibilities for creating a more student-centered environment. Digital tools and platforms provide a diverse range of resources, including interactive simulations, multimedia content, and personalized learning pathways. These resources cater to individual learning styles and paces, allowing students to delve deeper into topics and engage in self-directed learning. However, simply incorporating technology isn't enough. To truly harness its potential, educators need to embrace pedagogical approaches that leverage its strengths.

These approaches include the flipped classroom model, where technology delivers foundational knowledge outside of class, freeing up classroom time for interactive activities, discussions, and project-based learning. Gamification makes learning engaging and promotes healthy competition, providing immediate feedback and tracking student progress. Collaborative learning platforms foster communication and collaboration, allowing students to work on projects and share ideas. Lastly, personalized learning management systems (PLMS) enable educators to tailor learning experiences based on individual student needs, strengths, and weaknesses.

This study investigates the effectiveness of these and other technology-driven approaches in promoting student-centered learning. By exploring real-world applications and analyzing their impact on student engagement, achievement, and overall learning outcomes, the study seeks to contribute to a growing body of knowledge on how technology can empower students and improve educational experiences. The research will examine existing literature on student-centered learning methodologies and the potential of technology to enhance these approaches. It will also analyze case studies of successful technology integration in educational settings to identify best practices and challenges encountered. Ultimately, the goal is to provide educators with valuable insights and practical strategies for leveraging technology to create a more engaging and effective learning environment for all students.

Review of Literature

The existing literature underscores the transformative potential of technology in education, positioning it as a pivotal catalyst for advancing student-centered learning. Samaranayake (2020) accentuates the empowerment of students through technology- facilitated, active learning methodologies like project-based and problem-based learning, enhancing their engagement and connecting education to real-life applications. Kerimbayev, Umirzakova, et al. (2023) further this dialogue by systematically reviewing the integration of modern technologies in distance learning, highlighting varied implementations and the dual- edged sword of its advantages and limitations. Similarly, Trinidad and Ngo (2019), through action research, reveal the enrichment of student learning and engagement via technological tools, advocating for educational technology as a bridge to overcome traditional instructional challenges.

Pandey (2019) and Amhag (2016) delve into the design and impact of technology- enhanced, student-centered learning environments, emphasizing the role of technology in facilitating

interactive and customized learning experiences. These environments not only cater to individual learning styles but also promote critical thinking and collaborative learning. Hannafin et al. (2000) explore student-centered learning environments (SCLEs) that support inquiry through technology, while Calderón, Meroño, and MacPhail (2020) examine digital technology's influence on physical education teacher education, underscoring the significance of active, student-centered digital approaches.

Chen and Tsai (2021) and Sabzian, Gilakjani, and Sodouri (2013) examine educators' perspectives on integrating mobile technology into instruction, shedding light on the spectrum of teacher-centered to student-centered strategies and the constructivist framework for technology use in classrooms. Otto et al. (2024) contribute to understanding the digital practices supporting student-centered learning in higher education, particularly through the lens of the Covid-19 pandemic's enforced digital transition.

Despite the optimistic views on technology's role in education, a common thread across these studies is the nuanced challenges and barriers to effective implementation, from educator proficiency in digital tools to equitable access to technology for all students. These insights underscore a significant research gap: the need for a comprehensive exploration of how technology empowerment in education specifically influences student-centered learning outcomes in Kasaragod District. This gap beckons a focused inquiry into the integration, accessibility, and effectiveness of technology in teaching and learning processes, directly leading to the objectives of assessing the impact of technology empowerment on student-centered learning outcomes within this locale.

Statement of the Problem

The rapid evolution of digital technologies has significantly transformed the landscape of education, introducing new paradigms that emphasize student-centered learning through enhanced engagement and personalized educational experiences. In Kasaragod District, like many regions around the globe, educational institutions are at a crossroads, faced with the challenge of integrating these technological advancements effectively to nurture a more interactive and adaptive learning environment. Despite the potential benefits of technology empowerment in education, including increased accessibility to resources and opportunities for collaborative learning, there remains a lack of comprehensive understanding regarding how these technological interventions influence student learning outcomes and engagement within the district. This gap in knowledge underscores the need for a detailed investigation into the current state of technology integration in the curriculum, teacher digital proficiency, and the accessibility of technology for students, alongside its impact on fostering a conducive learning environment that caters to the diverse needs of students.

Consequently, this study seeks to unravel the intricate relationship between technology empowerment in education and its subsequent effects on student-centered learning outcomes in Kasaragod District. By assessing the distinct dimensions of technology integration within educational settings—ranging from the incorporation of digital tools into lesson plans to the availability of technological resources for students and the proficiency of educators in utilizing these tools—the research aims to illuminate the potential disparities and areas for improvement in the district's approach to digital education. The objective is to provide empirical evidence on the efficacy of technology empowerment as a catalyst for enhancing

student engagement, critical thinking, collaborative learning, and personalized education paths. In doing so, the study endeavors to offer actionable insights and recommendations for educational stakeholders in Kasaragod District to optimize technology integration strategies, thereby enriching the educational experience and outcomes for students in an increasingly digitalized world.

Objectives of the Study

1. To assess the distinct effects of different dimensions of technology empowerment in education in Kasaragod District.
2. To investigate the impact of technology empowerment in education on student-centered learning outcomes in Kasaragod District.

METHODOLOGY

Research Design

This investigation into the digital transformation of student-centered education in Kasaragod District embraces a descriptive research design. The primary objective is to elucidate the impact of technology empowerment within education on student-centered learning outcomes. By meticulously exploring how different facets of technological integration and accessibility influence educational experiences, this study endeavors to provide a comprehensive analysis of current practices and their effectiveness.

Sampling Technique and Size

A purposive sampling method was adopted to curate a representative sample of 127 students across various fields of study within Kasaragod District. This method ensures the inclusion of participants who directly interact with educational technologies, thereby offering valuable insights into their effects on learning outcomes. The sample encompasses students from diverse academic backgrounds, including Science & Technology, Arts & Humanities, Commerce & Business, Engineering, and Medicine & Health Sciences, to capture a broad spectrum of experiences and perceptions regarding technology in education.

Data Collection Methods

Data was primarily collected through a structured questionnaire, specifically designed to assess the dimensions of Technology Empowerment in Education and its impact on Student-Centered Learning Outcomes. The questionnaire solicited responses on factors such as technology integration in the curriculum, teacher digital proficiency, technology accessibility for students, and student engagement with technology, alongside demographic information. This approach was complemented by secondary data gathered from scholarly articles, educational reports, and digital learning resources to enrich the context and support the primary data analysis.

Data Analysis Tools

Quantitative analysis techniques were utilized to dissect the collected data, employing SPSS software for rigorous statistical examination. Descriptive statistics provided an initial overview of the data, while Pearson's correlation analysis was employed to identify relationships between technology empowerment and learning outcomes. Furthermore, multiple regression analysis was conducted to ascertain the predictive significance of technology empowerment factors on student-centered learning outcomes. The analysis aimed to unravel the intricate

dynamics between technology usage in education and its resultant impact on student engagement, critical thinking, and overall academic achievement.

RESULTS AND DISCUSSION

Table No. 1: Demographic Variables

Demographic Variables	Options	Frequency	Percentage	Total Percentage
Age Group	17 to 19 years	40	31.5	100%
	20 to 22 years	45	35.4	
	23 to 25 years	30	23.6	
	Above 25 years	12	9.4	
Major Field of Study	Science & Technology	30	23.6	100%
	Arts & Humanities	20	15.7	
	Commerce & Business	25	19.7	
	Engineering	30	23.6	
	Medicine & Health Sciences	22	17.3	

Source : Primary Data

INFERENCE: Table No. 1 reveals the distribution of respondents' demographic variables. In terms of age groups, the largest percentage of respondents falls within the 20 to 22 years age group (35.4%), followed by those aged 17 to 19 years (31.5%), 23 to 25 years (23.6%), and above 25 years (9.4%). Regarding their major field of study, respondents were evenly distributed among Science & Technology and Engineering, which both had the highest percentage (23.6%). This was followed by Commerce & Business (19.7%), Medicine & Health Sciences (17.3%), and Arts & Humanities (15.7%). Most (35.4%) of the respondents fall within the 20 to 22 years age group. In the major field of study, the highest percentages were tied, with both Science & Technology and Engineering each accounting for 23.6% of respondents.

Table no.2 Technology Empowerment in Education

Technology Empowerment in Education	Mean	Std. Deviation
Technology Integration in Curriculum		
Technology frequently incorporated into lessons	2.92	1.355
Variety of technologies used in coursework	3.05	1.379
Technology-based assignments commonly assigned	2.98	1.333
Teachers effectively blend technology into teaching	2.98	1.403
Use of technology aligns with learning goals	2.98	1.425
Average Score	**2.98**	**1.38**
Teacher Digital Proficiency		
Teachers display confidence in using digital tools	2.87	1.425
Teachers regularly employ technology to enhance learning	2.87	1.447
Teachers improve their tech skills for better instruction	2.87	1.469
Teachers are open to adopting new technologies	2.84	1.377

Teachers tech skills positively impact learning	2.87	1.369
Average Score	**2.87**	**1.42**
Technology Accessibility for Students		
Access to necessary technology for learning	2.94	1.341
Equal access to educational technology	3.05	1.284
Quality of technology available	3.08	1.343
Support for students using technology	3.09	1.266
School infrastructure supports technology use	3.06	1.277
Average Score	**3.04**	**1.30**
Student Engagement with Technology		
Student use of technology for learning	2.87	1.382
Student comfort using technology	2.81	1.379
Technology for collaborative learning	2.91	1.348
Perception of technology	2.88	1.423
Initiative to use technology for problem-solving	2.84	1.359
Average Score	**2.86**	**1.38**

INFERENCE : Table no.2 results reveals that the average scores for both technology integration in curriculum and teacher digital proficiency are slightly below the neutral point of 3, with averages of
2.98 and 2.87 respectively. These figures suggest a moderate level of satisfaction among students with how technology is incorporated into their learning environment and the digital proficiency of their educators. The standard deviation values, around 1.38 for technology integration and 1.42 for teacher proficiency, indicate a significant variation in responses, which could imply differing experiences and perceptions among students regarding the effectiveness and consistency of technology use in education. In terms of technology accessibility for students, the average score is slightly above the neutral point at 3.04, with a somewhat lower standard deviation of 1.30 compared to the other categories. This suggests a generally moderate to positive perception of access to necessary technology, equality of access, quality of technology, support for students using technology, and the adequacy of school infrastructure in supporting technology use. The relatively tighter clustering of responses (as indicated by the standard
deviation) reflects a more consistent experience among students in accessing and utilizing technology for educational purposes.

Lastly, the student engagement with technology scores are revealing, with an average score of 2.86 and a standard deviation of 1.38. This indicates a slightly below-neutral engagement and comfort level with using technology for learning purposes, including for individual learning, collaborative tasks, and problem-solving. Despite the growing emphasis on technology in education, this could highlight areas for improvement in making technology use more engaging and beneficial for students. The data underscores the need for educational stakeholders in Kasaragod District to focus on enhancing the integration, accessibility, and effectiveness of technology in teaching and learning processes to fully realize its potential in fostering a more engaging and effective student-centered learning environment.

Table No. 3 Student-Centered learning outcomes

Student-Centered learning outcomes	Mean	Std. Deviation
Teaching methods enhance engagement	2.91	1.359
Methods develop critical thinking skills	2.98	1.348
Learning activities foster collaboration	3.01	1.306
Opportunities for personalized learning	3.06	1.274
Educational approaches improve performance	3.06	1.355
Average Score	**3.00**	**1.33**

INFERENCE : From the above table no.3, the descriptive statistics for the Student-Centered learning outcomes are ranked from 'Opportunities for personalized learning' stood at first with the highest mean score 3.060, followed by 'Educational approaches improve performance' stood at first with the mean score 3.060, 'Learning activities foster collaboration' stood at second with the mean score 3.010, 'Methods develop critical thinking skills' stood at third with the mean score 2.980, and finally 'Teaching methods enhance engagement' stood at fourth with the mean score 2.910.

Hypothesis No.1

Null Hypothesis (H0): There is no significant correlation between the Technology Empowerment in Education and Student-Centered learning outcomes

Alternative Hypothesis (Ha): There is a significant correlation between the Technology Empowerment in Education and Student-Centered learning outcomes

Table No.4 Correlation analysis between the Technology Empowerment in Education and Student-Centered learning outcomes

Correlations						
		Technology Integration in Curriculum	Teacher Digital Proficiency	Technology Accessibility for Students	Student Engagement with Technology	Student-Centered Learning Outcomes
Technology Integration in Curriculum	Pearson Correlation	1	.002	.004	.182*	.227*
	Sig. (2-tailed)		.979	.967	.049	.014
	N	117	117	117	117	117
Teacher Digital Proficiency	Pearson Correlation	.002	1	.120	-.046	.061
	Sig. (2-tailed)	.979		.197	.623	.511
	N	117	117	117	117	117
Technology Accessibility for Students	Pearson Correlation	.004	.120	1	-.079	-.015
	Sig. (2-tailed)	.967	.197		.395	.876
	N	117	117	117	117	117

Student Engagement with Technology	Pearson Correlation	.182*	-.046	-.079	1	.232*
	Sig. (2-tailed)	.049	.623	.395		.012
	N	117	117	117	117	117
Student-Centered Learning Outcomes	Pearson Correlation	.227*	.061	-.015	.232*	1
	Sig. (2-tailed)	.014	.511	.876	.012	
	N	117	117	117	117	117
*. Correlation is significant at the 0.05 level (2-tailed).						

INFERENCE: The correlation analysis presented in Table No.4 results reveal a statistically significant positive correlation between Technology Integration in Curriculum and Student-Centered Learning Outcomes ($r = .227$, $p = .014$), indicating that as the integration of technology into the curriculum increases, so does the effectiveness of student-centered learning outcomes. Additionally, Student Engagement with Technology also shows a significant positive correlation with Student-Centered Learning Outcomes ($r = .232$, $p = .012$), suggesting that higher levels of student engagement with technology are associated with more favorable learning outcomes. Based on the analysis, it's evident that certain aspects of technology empowerment play a crucial role in enhancing student-centered learning outcomes. The findings support rejecting the Null Hypothesis (H0) and accepting the Alternative Hypothesis (Ha), demonstrating a significant correlation between the Technology Empowerment in Education and Student-Centered Learning Outcomes. This implies that initiatives aimed at integrating technology into educational curriculums and promoting student engagement with technology are likely to positively impact student learning experiences and outcomes.

Hypothesis No.2

Null Hypothesis (H0): There is no significant linear relationship between the predictors of Technology Empowerment in Education and Student-Centered learning outcomes

Alternative Hypothesis (Ha): There is a significant linear relationship between the predictors of Technology Empowerment in Education and Student-Centered learning outcomes

Table No.5 Model Summary between predictors of Technology Empowerment in Education and Student-Centered learning outcomes

Model Summary[b]										
					Change Statistics					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.306[a]	.094	.061	3.46157	.094	2.898	4	112	.025	1.802
a. Predictors: (Constant), Student Engagement with Technology, Teacher Digital Proficiency, Technology Accessibility for Students, Technology Integration in Curriculum										
b. Dependent Variable: Student-Centered Learning Outcomes										

INFERENCE : The model summary presented in Table No.5 explains that with an R Square value of

.094, the model explains approximately 9.4% of the variance in Student-Centered Learning Outcomes, which is attributed to the combined effect of predictors such as Student Engagement with Technology, Teacher Digital Proficiency, Technology Accessibility for Students, and Technology Integration in Curriculum. Although this percentage might seem modest, the significant F change value of .025 indicates that the predictors together make a statistically significant contribution to explaining Student- Centered Learning Outcomes, thereby validating the model's relevance. Furthermore, the Durbin- Watson statistic of 1.802 suggests that there is no substantial issue with autocorrelation in the residuals, ensuring the reliability of the regression model's results.

Table No.4 (a) ANOVA between predictors of Technology Empowerment in Education and Student- Centered learning outcomes

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	138.890	4	34.722	2.898	.025[b]
	Residual	1342.033	112	11.982		
	Total	1480.923	116			
a. Dependent Variable: Student-Centered Learning Outcomes						
b. Predictors: (Constant), Student Engagement with Technology, Teacher Digital Proficiency, Technology Accessibility for Students, Technology Integration in Curriculum						

INFERENCE : The ANOVA results presented in Table No.4 (a) demonstrate a significant relationship between the predictors of Technology Empowerment in Education and Student-Centered Learning Outcomes within the Kasaragod District's educational setting. The model, encompassing predictors

such as Student Engagement with Technology, Teacher Digital Proficiency, Technology Accessibility for Students, and Technology Integration in Curriculum, yields an F value of 2.898 with a significance level of .025. This indicates that these predictors collectively have a statistically significant impact on Student-Centered Learning Outcomes. The regression sum of squares, recorded at 138.890, alongside the residual sum of squares at 1342.033, elucidates the model's capacity to account for variance in Student-Centered Learning Outcomes, substantiating the efficacy of integrating technology into educational strategies to foster enhanced student-centered learning experiences.

Table No.4 (b) Coefficients between predictors of Technology Empowerment in Education and Student- Centered learning outcomes

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.094	2.833		2.504	.014
	Technology Integration in	.197	.095	.190	2.078	.040

	Curriculum					
	Teacher Digital Proficiency	.080	.102	.071	.784	.435
	Technology Accessibility for Students	-.009	.104	-.008	-.088	.930
	Student Engagement with Technology	.236	.109	.200	2.173	.032
a. Dependent Variable: Student-Centered Learning Outcomes						

INFERENCE: The coefficients table presented in Table No.4 (b) reveals that Technology Integration in Curriculum and Student Engagement with Technology emerge as significant contributors, with coefficients of .197 and .236, respectively, and corresponding significance levels of .040 and .032. These findings suggest that both the degree to which technology is integrated into the curriculum and the level of student engagement with technology positively influence student-centered learning outcomes. In contrast, Teacher Digital Proficiency and Technology Accessibility for Students do not exhibit a significant impact, as indicated by their higher significance values of .435 and .930, respectively. This analysis reveals the critical role that specific aspects of technology empowerment play in enhancing student-centered education, while also highlighting areas where the anticipated impact may not be as pronounced.

FINDINGS AND SUGGESTIONS

Findings of the study

1. The average scores for technology integration in curriculum (2.98) and teacher digital proficiency (2.87) suggest a moderate level of student satisfaction with the incorporation of technology in education and educators' digital skills, with a notable variation in student experiences.
2. Students generally perceive moderate to positive accessibility to technology (3.04 average score), indicating consistent access and quality of technology resources, with a tighter clustering of responses.
3. Student engagement with technology shows a slightly below-neutral average score (2.86), pointing towards areas for improvement in making technology use more engaging and beneficial for learning.
4. "Opportunities for personalized learning" and "Educational approaches improve performance" both achieved the highest mean score (3.060), indicating these factors significantly influence student- centered learning outcomes.
5. Statistically significant positive correlations between Technology Integration in Curriculum and Student Engagement with Technology with Student-Centered Learning Outcomes highlight the importance of these factors in enhancing learning.
6. The model explaining 9.4% of variance in Student-Centered Learning Outcomes indicates a statistically significant combined effect of predictors like Student Engagement with Technology, affirming the model's relevance.

7. ANOVA results demonstrate a statistically significant relationship between Technology Empowerment in Education predictors and Student-Centered Learning Outcomes, supporting the integration of technology into educational strategies.
8. Coefficients for Technology Integration in Curriculum and Student Engagement with Technology as significant contributors underscore the impact of these aspects on learning outcomes.
9. Variations in student satisfaction with technology integration and educator proficiency signal a need for focused improvements in these areas.
10. The findings collectively advocate for educational strategies in Kasaragod District that prioritize technology integration and engagement to foster a more effective student-centered learning environment

Suggestions

Based on the study's findings, it's clear that there are significant opportunities for enhancing the student-centered education system through more effective integration and utilization of technology. Educational institutions, particularly in the Kasaragod District, should focus on elevating the degree of
technology integration into the curriculum and improving teacher digital proficiency. To achieve this, professional development programs tailored towards enhancing educators' digital skills and incorporating innovative teaching methodologies that leverage technology could be vital. Furthermore, ensuring equitable access to high-quality technological resources for all students can significantly enhance the learning experience, suggesting the need for infrastructural investments and support systems that facilitate seamless access to technology for educational purposes.

Additionally, fostering student engagement with technology emerges as a crucial factor in enhancing student-centered learning outcomes. Initiatives that encourage active use of technology for learning, such as collaborative projects, technology-driven assignments, and problem-solving activities, should be incorporated more systematically into lesson plans. Given the positive impact of technology integration and student engagement on learning outcomes, schools and educators should prioritize creating a more interactive and technology-rich learning environment. This could involve adopting blended learning models, integrating educational apps into coursework, and promoting a culture of innovation and experimentation with new digital tools. Through these efforts, the potential of technology to transform student-centered education in Kasaragod District can be fully realized, leading to more engaging, effective, and personalized learning experiences for students.

Conclusion

The findings of this study underscore the potential of technology empowerment in education to significantly enhance student-centered learning outcomes in the Kasaragod District. It becomes evident that a concerted effort to integrate technology seamlessly into the curriculum and to foster digital proficiency among teachers can serve as a catalyst for elevating educational experiences. To capitalize on these insights, it is suggested that educational stakeholders in Kasaragod District prioritize the development and implementation of comprehensive training programs aimed at bolstering educators' capabilities in utilizing technology effectively. Additionally, ensuring that all students have equitable access to modern technological tools and

resources is imperative. This not only democratizes the learning environment but also ensures that the benefits of technology-driven education reach every student, thereby enhancing the overall quality of education provided.

Moreover, actively promoting student engagement with technology through innovative educational strategies is critical for optimizing learning outcomes. This entails incorporating technology-based learning activities that not only engage students but also cultivate critical thinking, collaboration, and problem-solving skills. By embedding technology more deeply into the educational fabric of Kasaragod District, schools can foster a dynamic learning environment that is both inclusive and adaptive to the evolving needs of students.

Ultimately, this study's suggestions aim to guide the Kasaragod District toward harnessing the full potential of technology in education, thereby preparing students for success in an increasingly digital world and contributing to the broader goal of improving student-centered education through technological advancement.

REFERENCES

1. Kerimbayev, N., Umirzakova, Z., Shadiev, R., et al. (2023). A student-centered approach using modern technologies in distance learning: A systematic review of the literature. *Smart Learning Environments, 10*, 61. https://doi.org/10.1186/s40561-023-00280-8

2. Trinidad, J., & Ngo, G. (2019). Technology's roles in student-centered learning in higher education.
International Journal of Action Research, 15, 81-94. https://doi.org/10.3224/ijar.v15i1.06

3. Pandey, N. (2019). Technology-Enhanced Student-Centered Learning Environments. *TechnoLearn: An International Journal of Educational Technology, 9*(2). https://doi.org/10.30954/2231- 4105.02.2019.3

4. Amhag, L. (2016). Mobile technologies for student centered learning in a distance higher education program. In *Wearable Technology and Mobile Innovations for Next-Generation Education* (pp. 184–199). IGI Global. https://doi.org/10.4018/978-1-5225-0069-8.ch010

5. Hannafin, M. J., & Land, S. M. (2000). Technology and student-centered learning in higher education: Issues and practices. *Journal of Computing in Higher Education, 12*, 3–30. https://doi.org/10.1007/BF03032712

6. Calderón, A., Meroño, L., & MacPhail, A. (2020). A student-centred digital technology approach: The relationship between intrinsic motivation, learning climate and academic achievement of physical education pre-service teachers. *European Physical Education Review, 26*(1), 241-262. https://doi.org/10.1177/1356336X19850852

7. Chen, C.-H., & Tsai, C.-C. (2021). In-service teachers' conceptions of mobile technology-integrated instruction: Tendency towards student-centered learning. *Computers & Education, 170*, 104224. https://doi.org/10.1016/j.compedu.2021.104224

8. Sabzian, F., Gilakjani, A. P., & Sodouri, S. (2013). Use of technology in classroom for professional development. *Journal of Language Teaching and Research, 4*(4). https://doi.org/10.4304/jltr.4.4.684-692

9. Otto, S., Bertel, L. B., Lyngdorf, N. E. R., et al. (2024). Emerging digital practices supporting student-centered learning environments in higher education: A review of literature and lessons learned from the Covid-19 pandemic. *Education and Information Technologies,*

29, 1673–1696. https://doi.org/10.1007/s10639-023-11789-3
10. Samaranayake, P. (2020). Student-centered learning with technology. *1*(1), 23-28.