

Effectiveness of Practices and Applications of Student-Centered Teaching and Learning in Primary Schools: A Systematic Literature Review

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Abstract

Student-centered learning has emerged as a transformative pedagogical approach that prioritizes active student engagement, autonomy, and personalized learning experiences. This systematic literature review investigates the effectiveness of student-centered teaching and learning practices in primary education settings. By analyzing empirical studies from 2019 to 2024, this review explores the impact of student-centered approaches on academic performance, cognitive development, motivation, engagement, and overall educational experiences of primary school students. The findings reveal that student-centered methods significantly improve academic achievement, critical thinking abilities, and learner motivation by fostering active participation, inquiry-based learning, and collaborative activities. Additionally, the review examines teachers' perceptions, challenges faced during implementation, and best practices for utilizing student-centered methodologies effectively. Gaps in the existing literature are identified, including the need for longitudinal studies on long-term effects, cultural considerations, and strategies to address implementation barriers in resource-constrained environments. Furthermore, current trends and innovations in student-centered learning, such as technology integration, cross-curricular approaches, and inclusive practices for diverse learners, are discussed. The review concludes by highlighting the importance of student-centered education in nurturing lifelong learning skills, promoting equity and social justice, and fostering sustainable educational systems. Overall, this systematic review contributes to a comprehensive understanding of student-centered learning in primary education and provides insights for educational stakeholders to enhance teaching and learning practices.

Keywords: Student-centered, Learner-Focused, Autonomous, Self-Directed, Child-Centred, Primary Schools, Children Elementary School, Lower School

Introduction

Student-centered learning has emerged as a transformative pedagogical approach that holds immense promise for modern education. It represents a paradigm shift from traditional teacher-centered methods, aligning with the demands of the 21st century and the need to

cultivate critical thinking, problem-solving abilities, and lifelong learning habits among students.

The importance of student-centered learning lies in its fundamental principles and outcomes. Firstly, it recognizes that learners are unique individuals with different needs, interests, and learning styles (Hoidn & Reusser, 2020). By tailoring instruction to these individual preferences and capabilities, student-centered learning promotes personalized learning experiences, enhancing motivation, engagement, and ultimately, academic achievement.

Moreover, student-centered learning empowers learners to take an active role in their intellectual growth, fostering autonomy, self-direction, and a sense of ownership over the learning process. Through hands-on activities, inquiry-based projects, and collaborative work, students develop complex cognitive skills such as analysis, evaluation, and synthesis, which are critical for lifelong learning and solving complex problems in the contemporary world.

Equally significant is the emphasis on active learning and the development of critical thinking skills. By ensuring that students are active participants in their learning processes, performing hands-on activities and problem-solving assignments, student-centered learning facilitates a deeper understanding of the material and nurtures essential skills like creativity, adaptability, and the ability to navigate complex challenges.

Furthermore, student-centered learning fosters autonomy and self-directed learning, empowering students to take full responsibility for their learning by setting goals, making decisions, and evaluating progress. This principle instils responsibility, focus, motivation, and self-confidence, which are invaluable assets for success in college and professional life.

Collaboration is another integral principle of student-centered learning, requiring students to work together on projects, share ideas, and respect others' perspectives. This approach develops vital social and communication skills, teamwork, and the ability to thrive in diverse and inclusive environments, which are essential in the workplace and society.

Finally, student-centered learning emphasizes the importance of feedback and assessment, providing learners with formal and informal guidance to recognize their strengths and areas for improvement. This ongoing assessment ensures that educators can continually refine their instruction, making learning more comfortable, relevant, and effective for each student.

In essence, student-centered learning is an inclusive learning environment that focuses on students' needs, involvement, collaboration, and feedback, guiding educators in creating the best possible learning environment that nurtures critical thinkers and lifelong learners prepared for the challenges and opportunities of the future.

Literature Review

Importance and Benefits of Student-Centered Learning in Primary Education

Student-centered learning is a crucial and as well as a beneficial approach in primary education. Student-centered learning has gained much recognition and importance considering its numerous benefits. Many benefits are due to the congruence of student-centered learning with the developmental needs, learning styles and cognitive abilities of primary school going children (Dunbar & Yadav, 2022). Therefore, student-centered learning improves academic achievement, motivation and overall development in these children. One of the numerous benefits and importance of student-centered learning in primary education concerns personalized learning that is based on the variability of students. The premise of this approach is that each student is unique and should be supported or challenged according to one's performance. It enhances active participation and engagement among primary children through hands-on activities, guided investigations and inquiry-based and experimental

learning (Dada et al., 2023). Therefore, it leads to improved cognitive development, motivation and overall student development.

Student-centered learning instills autonomy and independence among primary children by supporting self-directed learning. They are encouraged to set goals, monitor and evaluate their own performance (Abdigapbarova & Zhiyenbayeva, 2023). Therefore, children develop autonomy and self-confidence regarding selecting and evaluating their learning sources. In addition, development of social collaboration, interpersonal relations and learning is facilitated through student-centered learning. This is critical in developing cognitive, social, affective and communication skills among the children. Student-centered learning as well develops critical thinking and problem-solving skills. It develops higher-order thinking's essential for analytical and critical decisions in the future. Finally, student-centered learning in primary education establishes a healthy and positive relationship between students and teachers. Teachers act as mentors rather than facilitators offering guidance and counseling through the learning process.

Theoretical Frameworks Supporting Student-Centered Learning

Several theoretical frameworks and perspectives support student-centered learning and guide its design, implementation, and effectiveness in education. These frameworks include different perspectives on the nature of learning, teaching, and the dynamics between students and educators in the learning process. One of the key theoretical frameworks that support student-centered learning is constructivism. Constructivism is based on the assumption that learners create their understanding of the world by incorporating new information and experiences into their existing knowledge structures (Chen & Tsai, 2021). For student-centered learning, constructivism implies the importance of students' prior knowledge, experiences, and social interactions in the outcomes of learning. Educators who use a constructivist approach design learning using an inquiry-based, hands-on, collaborative approach that allows students to explore, discover, and "construct meaning" out of content and concepts.

Another theoretical framework that supports student-centered learning further is social constructivism. Social constructivism is similar to pure constructivism; it is focused on the social nature of learning that is not an isolated activity. Social constructivism extends the principles of constructivism to affirm that learning is best achieved through interactions with others in society: peers, teachers, and members of the broader community. For example, social constructivism-aligned student-centered learning facilitates social responsibility learning, student social skills learning, and service learning (Shehata et al., 2023). Cognitive psychology theories are another theoretical framework that supports student-centered learning. Cognitive learning theory focuses on the internal mental processes of the learner such as thinking, knowing, understanding, remembering, and problem-solving. Educators who apply cognitive learning theory emphasize the use of memory systems, attention, and critical thinking beliefs in promoting the ability to apply cognitive strategies to understand and solve problems. The motivation theory is a theoretical framework that aligns with the need for student psychological and spiritual balance.

One of the most recognized motivation theories is Self-determination theory which sheds light on the human relationship with their natural or external environments. It explores how people are energized, directed, and sustained to engage in basic activities. The fifth theoretical perspective is Humanism, which is based on a "being" outlook. The humanistic perspective is a view that emphasizes the power and satisfaction of understanding the human

being. It is based on the conviction that man is continually striving to achieve self-actualisation (Komatsu et al., 2021). The student-centered learning environment directly underpins the humanistic concepts by providing students a chance to address their feelings and enhance the trust they feel for them. All these perspectives underlie student-centered learning, integrating them assists to design environments in which students' active engagement, collaboration, independence, metacognitive learning, and holistic development are in harmony.

Key Components of Student-Centered Learning in Primary Schools

Active Student Engagement and Participation

Active student engagement and participation are core principles of student-centered learning that prioritize active student participation, interaction, and contribution to the process of teaching and learning. Such an aspect of student-centered learning is based on constructivist and social constructivist theories emphasizing the active role of learners in constructing their own knowledge and understanding through genuine experiences and encounters. A critical component of active student participation and engagement in student-centered education is the use of hands-on and other types of experiential learning activities. Teachers purposefully create learning opportunities for students to manipulate materials, engage with ideas, and implement their understanding through the use of genuine contexts (Dakovic & Zhang, 2020). These hands-on experiences can become experiments, simulations, projects, field trips, role-plays, among other devices used to support student participation through their interactions with materials and the physical manifestation of their thinking. In addition to hands-on experiences, active student participation and engagement include nurturing a sense of curiosity, inquiry, and problem solving. The student-centered classroom encourages questioning, investigation, data analysis, proof and problem resolution (Sudarman & Ardian, 2021). This level of inquiry facilitates intellectual curiosity, creativity and a more profound understanding of concepts as students can explore questions about things of interest and relevance to them.

Active student participation and engagement also include collaborative learning through dialogue and exchange of information among peers. Student-centered learning paradigms motivate peer collaboration and group work through student discussions, dialogues, and debates that enhance communication, teamwork and even the sense of community amongst learners. Student-centered learning actively involves students in their learning with educational opportunities and options (Dunbar & Yadav, 2022). Active engagement and activities in student-centered learning include the ability of students to choose what interests them and to negotiate, set and pursue their learning goals. The use of online platforms and computer tools in a student-centered classroom and interaction enhances active engagement in learning activities. Technology-rich student-centered learning integrates computer and digital aids into student learning situations further allowing students an opportunity to use the tools of the digital economy to exercise some level of participation.

Autonomy and Self-Directed Learning

In student-centered education, autonomy and self-directed learning are two essential principles that underpin students' capability to take control of their learning, establish learning objectives, make decisions, and regulate their learning activities. These principles concur with constructivist and humanistic learning theories, which emphasize the learners' part in creating knowledge and developing agency within a lifetime learning process. One

feature of autonomy is that students focus on student-directed learning through the development of students' agency and decision-making capability (Otto et al., 2024). Educators design surroundings in which the students can establish goals, define how quickly they advance and the way they learn. For example, students may choose their topic, read across any resources they choose to understand and perform various exercises that suit their needs. The second critical component of autonomy is the pupil's ability to monitor themselves and their metacognitive abilities. Autonomy is attained when students select topics of interest or relevance, pick resources to understand, and work out which approaches they prefer according to their learning style (Ashwin, 2020). This concept relates to the theory of intrinsic motivation, involvement, and self-directed learning.

Additionally, autonomy encompasses investigation interests and inquiry of young individuals in the field of interest. Students may ask inquiries or explore in their free time to find out the answer when the subject that interests them immensely appears. Finally, autonomy encompasses evaluating and responding to pupil feedback. Students understand or reject feedback and mirror on it when it is given to them before making any decisions. Autonomy fosters students' agency, self-regulate, explore, ponder, and learn independently. Additionally, autonomy encompasses the utilization of technology. Autonomy may also be acquired from technology (Dakovic & Zhang, 2020). In this scenario, technology is defined as digital tools that allow students' information, self-paced learning, peer-to-peer instruction, and continuously improve learning. Hence students use information to establish study objectives and explore when new developments arise.

Collaborative Learning and Peer Interaction

Another crucial component of student-centered education is collaborative learning and peer interaction. It formulates the benefits of social interactions, cooperative activities, and collective education explaining the formation of knowledge from student interaction. This principle correlates with the learning theories of social constructivists that emphasize the significance of social interaction and dialogue in the education of cognitive development, outcomes, and mentally meaningful understanding (Sudarman & Ardian, 2021). In student-centered education, one aspect is that of collaborative working and group activities. The instructors create learning exercises, projects, and homework that the students must finish as a team in a collaborative setup. Collaborative work compels the students to interact through discussions, knowledge sharing, meaning negotiation, meaningful co-construction through discussions, joint work, and interaction. It develops communication, cooperation, and teamwork and establishes an atmosphere of community and support (Soubra et al., 2022). The other aspect of collaborative learning is peer interaction that occurs in multicultural classrooms.

Peer collaboration encompasses discussions, arguments, peer support, and co-projects that develop dialogue, individual critical thinking, knowledge sharing, and social communication. In student-centered education, peer interaction enables the students to share information experiences, creatively, responsible reviews, and interactive problem-solving. The final aspect of student-centered collaborative learning is collective responsibility. Working together in collaborative projects in group activities, students assume specific roles or duties, contributions, and specialities towards the goals. The educator assists the collective exercises in making various rules and norms, role assignment and role play, resolution of conflict, and respect for fairness, cooperation, and teamwork (Dakovic & Zhang, 2020).

Additionally, collaborative learning in student-centered education enables diversity,

inclusivity, and respect for multiple truths. Peers in the learning set come from differing backgrounds, experiences, or regional environments they are accustomed to, making it possible to celebrate differences, acknowledge the diversity of ideas, and cultivate understanding and empathy. Essentially, collaborative learning surroundings are inclusive spaces where equity and respect define engagements, meaningful dialogues, cooperation, and mutual growth. Moreover, collaborative learning in student-centered education extends beyond the classroom to collaborative projects or community attachments (Dada et al., 2023). Students work with external persons in the learning set, experts in the field, or community stakeholder for a common project or a business or real-world activity addressing a current challenge. A complete lateral desirable factor to this is advanced growth in teamwork and leadership, problem-solving, and effective communication, which prepares them for a pluralistic engagement and participation environment.

Authentic and Real-World Contextualization of Learning

One of the basic principles of student-centered education is authentic and real-world contextualization, which is an approach to learning that involves aspects of students' cultural contexts and the interconnectedness between theory and practice, subject areas, and students' identities. This principle is based on the constructivist approach to learning, which requires presenting tasks and problems in a way that they are authentic and real, but it also includes the notion of experiential learning, where tasks should be connected to students' real experiences for them to learn from it. The action is a task that students are making, such as essays, projects, etc., and the experience is a real-life situation or a student's life story.

First, student-centered education is represented by the notion of authentic tasks and projects. It means that educators should present tasks that reflect real life and problems for students to solve. It means that there is a connection to the real world in the way the tasks are presented (Ochoa & Wise, 2021). Educators create learning activities, simulations, case studies or projects in which students need to apply what they know to solve a case or answer an open question, and they reflect real-world problems or issues. It should be noted that, in such tasks, students learn from their action by solving the case or answering the question. In addition, apart from tasks, authentic and real-world contextualization also includes the connection to students' interests and experiences. It means that learning activity should be meaningful and interesting to the student. Practically, it means that the educator needs to connect students' interests with the curriculum (Sudarman & Ardian, 2021). However, it is also important to understand the student's background, so the educator should include this, too. In addition to tasks and connection to background and experiences, authentic and real-world contextualization is also connected to cross-curricular activities. This means that the task should include knowledge and experience from different areas. The angle this includes is to show students how various disciplines are interconnected.

Furthermore, authentic and real-world contextualization in student-centered education also involves the use of technology, digital tools, and multimedia to improve learning and replicate real-world scenarios and settings (Wong, 2021). In a student-centered curriculum, teachers often utilize digital platforms, simulations, virtual field trips, as well as other interactive tools to enable students to experience simulations, conduct role-play, or engage in authentic problem-solving exercises. Technology-based learning environments provide students with a broader range of resources, enhancing digital literacy and creativity and innovation and facilitating realistic learning situations beyond the classroom. Additionally, real-world and authentic contextualization in student-centered education also takes place outside the

confines of the classroom. Teachers collaborate with communities, external stakeholders, and other specialists to create authentic experiences, programs, or projects that address real-world problems, issues, or opportunities (Benlahcene et al., 2020). Learning from the community, service tasks, internships, and industry engagement enable students to utilize their knowledge and skills in authentic contexts and gain real-life experience while collaborating on meaningful and relevant projects.

Feedback and Assessment Practices in Student-Centered Approaches

In student-centered approaches, feedback and assessment practices are among the essential components that support the effectiveness and success of attempting student-centered learning environments. Based on constructivist, socio-constructivist, and formative assessment theories, the feedback-focused and oriented self-assessment, peer evaluation, and reflective practice are actively involved in enabling learning, development, and growth among students. Specifically, formative feedback is a critical component of feedback and assessment in student-centered approaches (Hoidn & Reusser, 2020). Formative assessment focuses on providing upfront, specific, and relevant feedback to students at the early stages of learning processes. For example, educators use quizzes, polls, self-assessments, peer reviews, and check-ins to ascertain students' current knowledge and understanding, monitor their progress and achievement, assess their current and future learning needs, and provide feedback for growth and development.

Based on the formative assessment's goal, feedback plays a significant role in guiding the decision on reflection, goal setting, and adjustment to support and improve students' outcomes and performance (Otto et al., 2024). Passages or conferences on feedback are other aspects of the capacity of feedback in student-centered learning approaches. Feedback passages and conferences imply that feedback is a dialogic process that requires constant communication, collaboration, and contact between educators and students. Feedback is more than giving information but rather is a multilayered and complex conversation that involves reflexivity, mirroring, and metacognition (Shehata et al., 2023). Thus, educators have feedback talks or conferences with students about their experience, best practices, goal setting, and ways to nurture and grow, allowing students to own their learning and become responsible for feedback.

In addition, feedback and assessment in student-centered approaches are characterized by peer feedback, peer assessment, and assessment for learning. For example, students are involved in peer feedback review, group assessment feedback, or collaborative assessment tasks where they assess their peer's work, providing positive criticism, suggestion for improvement, and reflective discussion about their work. Peer feedback encourages active learning, critical thinking, and a cooperative approach to learning as students learn from each other, share different views, enhance their communication skills and cultivate an open-minded attitude and empathy (Dada et al., 2023). Monitoring and assessment for learning in student-centered approaches involve high aspects of incorporating student voice, choice, and agency. Students are provided choice to generate assessment criteria, set learning objectives, seek assessment formats, and self-assess their learning progress (Ashwin, 2020). For instance, students set goals they want to achieve, self-assessment their work, and reflect on an issue they learned. Self-assessment enhances students' metacognitive understanding, self-regulation, and a sense of agency, and responsibility for the learning process. Assessment for student learning requires holistic assessment approaches that recognize students' diversity, equity, and safety.

Research Question and Objectives

The purpose of this research is to systematically analyze whether student-centered teaching and learning practices are indeed effective in primary schools. The main research question emerges as follows:

“How effective are student-centered educational practices in improving the learning outcomes, engagement, and overall educational experience of primary school students?”

The set objectives imply the following:

1. To analyzing the impact of this practice on primary students' academic performance and cognitive development.
2. To examining the ways in which it affects their motivation and engagement.
3. To learn more about the teachers' experience and their perceptions and challenges
4. To identify the best practices and recommendations to help teachers better utilize student-centered methodologies in primary education.

The study of the effectiveness of student-centered teaching and learning practices in primary education holds significant importance and potential benefits for various stakeholders in the education sector and society at large.

For primary school students themselves, this line of research is invaluable as it investigates approaches that can profoundly impact their academic achievement, cognitive development, motivation, and overall engagement with the learning process. By fostering active participation, autonomy, and personalized learning experiences, student-centered pedagogies have the potential to ignite a lifelong love for learning and equip young learners with essential skills such as critical thinking, problem-solving, and collaboration, which are crucial for success in their future academic and professional endeavours.

The findings of this study are also highly relevant for primary school teachers and educators. A deep understanding of the effectiveness and best practices of student-centered approaches can inform their instructional strategies, classroom management techniques, and assessment methods. This knowledge can empower teachers to create more inclusive, engaging, and tailored learning environments that cater to the diverse needs and learning styles of their students, ultimately leading to improved teaching efficacy and job satisfaction.

Furthermore, this research area is of great significance for educational policymakers, curriculum developers, and school administrators. The insights gained from these studies can guide the development of educational policies, curriculum frameworks, and professional development programs that promote and support the implementation of student-centered practices in primary schools. This, in turn, can contribute to the overall enhancement of the educational system and its ability to prepare future generations for the rapidly changing demands of the 21st century.

Moreover, the study of student-centered learning in primary education has implications for the broader community and society. By fostering active citizenship, critical thinking, and collaborative skills from an early age, these approaches can contribute to the development of a more engaged, informed, and socially responsible populace. Additionally, the emphasis on inclusivity and catering to diverse learners can promote equity and social justice, ensuring that all children, regardless of their backgrounds or abilities, have access to quality education and opportunities for personal growth.

In conclusion, the study of student-centered teaching and learning in primary schools is crucial and beneficial for students, teachers, policymakers, and society as a whole. It holds the potential to transform educational experiences, unlock young minds' full potential, and

cultivate the skills and mindsets necessary for navigating the complexities of our rapidly evolving world.

Methodology

Review Protocol

The review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses [PRISMA]. Over the past five years (2019 - 2024), a search in the Scopus, WoS, ERIC and JSTOR databases will be completed to identify articles related to student-centered teaching and learning in the context of primary education. The selection criteria employed for this review will include peer-reviewed articles that present empirical research and relevant theory articles. Studies will be screened based on title and abstract, and the full text will be evaluated for eligibility. Moreover, the following data will be extracted: the study's location or country, methodology, participant types, intervention or approach specifics, and key outcomes. Additionally, quality appraisal will be based on standardized checklists. Finally, individual findings will be synthesized thematically depending on the effectiveness of student-centered practice and possible barriers to implementation.

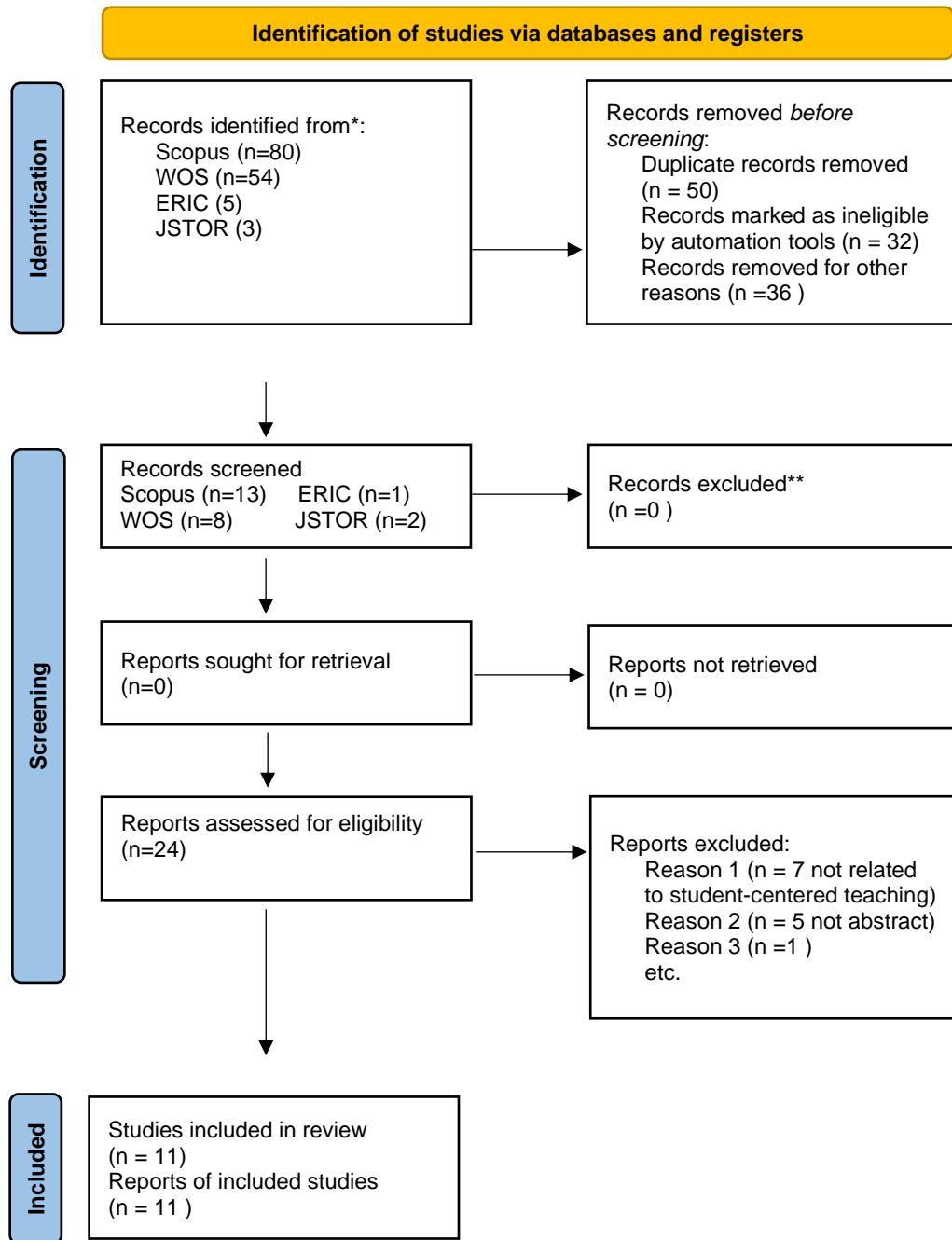
Table 1

Search Keyword

No.	Keywords	Synonym	Related Words	Variations
1.	Student-centered	learner-focused autonomous self-directed child-centred	student-driven Learner-oriented	
2.	Primary schools	Primary School Children Elementary School Lower school	Grade School	Primary School

Diagram 1

PRISMA flow diagram of the study selection process.



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

Table 2

Summary of Article Findings

BIL	AUTHOR (YEAR)	TITLE	RESEARCH DESIGN	COUNTRY
1	Chen, C. H., & Tsai, C. C. (2021)	In-service teachers' conceptions of mobile technology-integrated instruction: Tendency towards student-centered learning.	QUALITATIVE	TAIWAN
2	Dada, D., Laseinde, O. T., & Tartibu, L. (2023)	Student-centered learning tool for cognitive enhancement in the learning environment.	MIXED METHOD	SOUTH AFRICA
3	Dunbar, K., & Yadav, A. (2022).	Shifting to student-centered learning: Influences of teaching a summer service learning program. <i>Teaching and Teacher Education</i>	QUALITATIVE	USA
4	Katawazai, R. (2021)	Implementing outcome-based education and student-centered learning in Afghan public universities: the current practices and challenges	MIXED-METHOD	AFGANISTAN
5	Koehler, A. A., & Meech, S. (2022).	Ungrading learner participation in a student-centered learning experience	N/A	N/A
6	Morel, G. M. (2021).	Student-centered learning: context needed	N/A	USA
7	Ochoa, X., & Wise, A. F. (2021).	Supporting the shift to digital with student-centered learning analytics.	N/A	USA
8	Sørensen, A., Lagestad, P., & Mikalsen, H. K. (2023).	Student teacher experiences of learning and pedagogical involvement using a student-centered learning approach	QUALITATIVE	NORWAY
9	Soubra, L., Al-Ghouti, M. A., Abu-Dieyeh, M., Crovella, S., & Abou-Saleh, H. (2022).	Impacts on student learning and skills and implementation challenges of two student-centered learning	MIXED METHOD	QATAR

		methods applied in online education.		
10	Sudarman, S., & Ardian, A. (2021).	The development of interactive module to support student centered learning.	QUANTITATIVE	INDONESIA
11	Abdigapbarova, U., & Zhiyenbayeva, N. (2023).	Organization of student-centered learning within the professional training of a future teacher in a digital environment	QUANTITATIVE	KAZAKHSTAN

Research Findings

Studies Demonstrating Improved Learning Outcomes in Student-Centered Environments

In fact, student-centered learning environments have been studied in many research projects, and research findings reveal the benefits and improvements of traditional teacher-centered educational approaches. These studies have used a variety of research methodologies, including quantitative, qualitative, and mixed approaches, to investigate the effectiveness of student-centered approaches in all kinds of educational setups and subject areas (Abdigapbarova & Zhiyenbayeva, 2023). One of the aspects that have been researched is better results in terms of academic achievements. Particularly, different research has demonstrated that students in student-centered classrooms could achieve better results in terms of their achievements in standardized tests, grades for courses, or results of subject-specific testing. For example, in the study of Otto et al. (2024), in the meta-analysis of student-centered learning effectiveness, multiple results were analyzed, and the authors concluded that “student-centered learning had a significant positive impact on academic achievement across the disciplines”.

Another aspect of better outcomes of student-centered learning learning is cognitive development and critical thinking. Students in such environments improve their cognitive abilities by engaging more in cognitive processes, problem-solving, analytical thinking, and metacognitive awareness. A long-term study by Katawazai (2021) investigated the effect of student-centered learning on critical thinking and mental flexibility. They found that “student-centered learning can substantially improve critical thinking skills and cognitive flexibility”. As was mentioned above, another aspect that has been studied is motivation, engagement, and self-efficacy. Research studies showed that motivational drivers in such a system work well. Students with their choices and own responsibility get more interested in what they do and are self-reliant when it comes to learning.

In addition, studies have investigated the role of collaborative learning and peer interaction in student-centered learning environments in influencing learning outcomes. Collaborative activities such as group work, peer review, and cooperation have been associated with improved communication and teamwork skill as well as social and emotional growth for students. According to Abdigapbarova & Zhiyenbayeva (2023), student-centered environments significantly influence learning outcomes. Students have a better understanding and are more engaged when in student-centered environments where collaboration is fostered. Furthermore, studies have explored the influence of formative

assessment and feedback on learning outcomes. Formative assessment and feedback such as self-assessment, peer-review, and constant feedback from educators promote metacognitive awareness and the learning progress. Wong (2021) studies show that formative assessment significantly influences learning outcomes. There is increased student retention and satisfaction when educators emphasize formative assessment practices such as regular feedback in student-centered classrooms.

Impact of Student-Centered Approaches on Motivation and Engagement

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Teacher and Student Perceptions of Student-Centered Learning

Teacher and student perceptions of student-centered learning are critical in determining the effectiveness, usability, and outcomes of student-centered educational concepts. By

examining how teachers and learners view student-centered learning, one can gain important insights into the impact, limitations, advantages, and potential areas for improvement in students' learning settings. Teachers' perceptions of student-centered learning are often aligned with their beliefs, attitudes, practices, and experiences as conductors of student-centered classrooms. Many of them consider student-centered teaching strategies to be beneficial, particularly due to their ability to advance students' agency, autonomy, active learning, and critical thinking. Based on Wong (2021), teachers view student-centered classrooms as more interactive, engaging, and inclusive. These environments enable students to be in control of their learning, collaborate with their peers, and apply their knowledge to real-life situations.

Teachers' perspectives on student-centered learning are also influenced by their beliefs in effective teaching techniques, educational philosophies, and instructional processes. Teachers who adhere to constructivist, socio-constructivist, or progressive philosophies of education are more likely to value active, experiential, and inquiry-based forms of student learning. They also have a more positive opinion about student-centered learning environments as it enables the development of deeper understanding, critical thinking, and problem-solving skills and lifelong learning habits among students (Benlahcene et al., 2020). However, some teachers may also express some concerns or difficulties related to student-centered learning approaches such as time management, discipline, grading protocols, and finding a balance between ensuring student autonomy and equating maintaining academic standards. Hargreaves and Fullan and Darling-Hammond et al. discuss learners' perspectives on student-centered learning as multi-faceted, changing, and dynamic processes adaptable to various learners' needs and learning environments.

However, students' perceptions of student-centered learning can be defined as subjective and related to their prior experiences, preferences, learning styles, and attitudes toward the learning process. For instance, many learners are likely to focus on student-centered approaches that include regular participation and collaboration, choice and control, and personalization opportunities. Humanized environments that put students in charge of their learning are engaging, meaningful, and relevant, in fact, since they offer opportunities to voice their opinion and interest, explore passions, and address real-world issues. Again, perceptions are many-sided and are primarily based on experience and interactions with teachers, peers, and learning resources in the classroom (Sørensen et al., 2023). With more autonomy, opportunities for collaborative work, and feedback forms, students understand that student-centered settings are attractive. They value learning autonomy, responsibility, and the feeling of ownership of their academic process, which means they are also motivated to do it their best.

Challenges and Limitations of Implementing Student-Centered Approaches

Teacher and student perceptions of student-centered learning are critical in determining the effectiveness, usability, and outcomes of student-centered educational concepts. By examining how teachers and learners view student-centered learning, one can gain important insights into the impact, limitations, advantages, and potential areas for improvement in students' learning settings (Otto et al., 2024). Teachers' perceptions of student-centered learning are often aligned with their beliefs, attitudes, practices, and experiences as conductors of student-centered classrooms. Many of them consider student-centered

teaching strategies to be beneficial, particularly due to their ability to advance students' agency, autonomy, active learning, and critical thinking.

These environments enable students to be in control of their learning, collaborate with their peers, and apply their knowledge to real-life situations. Teachers' perspectives on student-centered learning are also influenced by their beliefs in effective teaching techniques, educational philosophies, and instructional processes. Teachers who adhere to constructivist, socio-constructivist, or progressive philosophies of education are more likely to value active, experiential, and inquiry-based forms of student learning (Shehata et al., 2023). They also have a more positive opinion about student-centered learning environments as it enables the development of deeper understanding, critical thinking, and problem-solving skills and lifelong learning habits among students. However, some teachers may also express some concerns or difficulties related to student-centered learning approaches such as time management, discipline, grading protocols, and finding a balance between ensuring student autonomy and equating maintaining academic standards.

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Discussion

Current Trends and Innovations in Student-Centered Learning

Integration of Technology in Student-Centered Pedagogies

One of the keys to integrating technology into student-centered pedagogies is the opportunity to personalize learning experiences based on digital tools and platforms (Wong, 2021). From adaptive learning systems and intelligent tutoring systems to personalized learning platforms, education platforms can use the students' profiles, data analytics algorithms to adapt instruction, content, and feedback to their needs, preferences, and learning styles. In this way, technology integration in student-centered pedagogies can support a variety of personalized learning pathways, scaffolds, and feedback mechanisms. Additionally, digital tools and platforms in connectivity can include gamified elements, such as badges, leaderboards, and rankings that incentivize students to participate in collaborative activities and strive to achieve higher goals (Benlahcene et al., 2020). Furthermore, educational games and simulations enable an immersive, interactive, and authentic experience and facilitate student engagement and motivation.

In addition, integrating technology in student-centered pedagogies promotes collaboration, communication, and knowledge sharing among students. Online platforms for collaboration,

discussion boards, social media, and cloud-based tools allow students to work together on projects as well as share ideas, comment on one another's work, and build knowledge via a variety of formats in a digital space. As a result, integrating technology into a student-centered pedagogies promotes inquiry-based approaches and the development of problem-solving and critical thinking skills (Komatsu et al., 2021). Student-centered environments make use of digital analysis tools, databases, and data visualization software, as well as information literacy resources, to conduct research, examine issues, and make evidence-based arguments. Software facilitates inquiry projects and problem-solving assignments that help students apply their understanding to unusual or complex problems and come up with useful solutions. For example, research by Barron and Jonassen explores the application of technology in supporting inquiry-based learning in student-centered environments. Technology-oriented assessments, such as self-administered quizzes, interactive in-class assignments, and peer-source reviews, promote self-assessment, reflection, and metacognition mode in students.

Cross-Curricular and Interdisciplinary Approaches in Student-Centered Learning

Cross-curricular and inter-disciplinary approaches in teaching and learning, as components of the student-centered focus, are gaining more insights in educational environments. The rationale for these two approaches is based on the need for students to experience and learn in a holistic, interconnected and integrated manner (Otto et al., 2024). Cross-curricula and interdisciplinary approaches cut across subject and discipline-based content to develop connections, relevance and understanding of the content in multiple disciplines. This supports the development of critical, creative and collaborative learning. Cross-curricular and interdisciplinary learning involve intensive and extensive exposure to various discipline-based concepts of knowledge areas. This includes sciences, mathematics, language arts, social studies, arts and other content and context areas.

In addition, cross-curricular and interdisciplinary approaches create connections between academic content and real-world contexts that enable students to perceive the content as relevant, authentic, and engaging (Katawazai, 2021). The learning experiences are contextualized as authentic problems, challenges, and situations found in students' lives, communities, or careers. Students find the content more relevant and learn it while applying it to the real world; hence, they develop transferable skills, including critical thinking, problem-solving, and decision-making. For example, during a STEM project that involves designing sustainable solutions for environmental challenges, the students may work with industry, community partners, or stakeholders to address authentic environmental challenges.

Moreover, cross-curricular and interdisciplinary approaches facilitate inquiry, exploration, and discovery among student-centered learning (Dunbar & Yadav, 2022). Students are required to question and investigate answers to complex questions that cannot be answered from one discipline. Inquiry projects, case studies, and problems demand students to analyze and present evidence in different disciplines. For instance, during a historical inquiry project, students may examine historical incidences to understand their impact on the contemporary world. Krajcik et al. and National Research Council analyses the inquiry as a cross-disciplinary approach to analyze findings, evidence, and disciplinary issues.

Moreover, cross-curricular and interdisciplinary approaches enhance students' collaboration, communication, and teamwork skills. Learning through collaborative projects, teamwork assignments, group discussions, peer feedback, and interdisciplinary tasks involves students

in active interaction and collaboration with each other, sharing their thoughts, negotiation of perspectives, and cocreation of knowledge across disciplines (Wong, 2021). Collaboration also helps students learn social and emotional skills, empathy, and develop appreciation for different perspectives and contributions of members of interdisciplinary teams. For example, in a collaborative design project that combines art, engineering, and technology, students may work in interdisciplinary teams and share ideas for a prototype design that will be implemented into a working design, which will be presented to another audience.

Inclusive Practices and Student-Centered Approaches for Diverse Learners

Inclusive practices in student-centered approaches create learning environments that acknowledge and respond to all students' needs, backgrounds, abilities, and learning styles. In general, inclusive practices promote equity, access, participation, and success in all aspects of learning for all students with diverse learning profiles. These students include students with disabilities, English language learners, gifted students, students from a low socioeconomic background, and students with diverse cultural and linguistic perspectives. Utilizing inclusive practices in student-centered approaches involves using strategies, adaptations, and supports that facilitate active involvement, learning that is tailored to individual needs, and personal learning experiences for all learners (Sudarman & Ardian, 2021). Another feature of inclusive practices is differentiating learning and providing personalized learning pathways to meet each student's individual needs. In a student-centered approach, educators create learning opportunities, including multiple pathways, entry points, and options, to access the content, show comprehension, and interact in substantive learning activities. Differentiated instruction in this setting may take several forms based on the learner's readiness, interest, and learning profile (Dada et al., 2023). For example, developing choice boards, flexible student groupings, tiered assignments, and scaffolded supports enabled learners to advance at their own pace, level, and learning preference while engaging in student-centered tasks. Additionally, inclusive practices in student-centered approaches stress the need for adherence to Universal Design for Learning principles to ensure the development and implementation of accessible and inclusive learning experiences (Katawazai, 2021). UDL frameworks describe the guidelines, strategies, and tools that educators should apply to design flexible, equitable, and barrier-free learning environments that accommodate individual learning needs and preferences. UDL principles promote a strategy that incorporates multiple means of representation, engagement, and expression to ensure learners can access, engage, and demonstrate their learning. As an alternative, educators integrate multimedia resources, interactive tools, visual and audio aids, and assistive technology to support learners with various learning styles and abilities.

Moreover, inclusive practices in student-centered approaches entail a culturally relevant teaching and learning approach (Sudarman & Ardian, 2021). This means that educators recognize and appreciate students' cultural backgrounds, languages, experiences, identities, and perspectives. They consider such inputs as assets and a means of cultural diversity and community building, which also contribute to multiple ways of knowing, understanding, and learning. This is referred to as a culturally relevant teaching strategy and imperative, which involves the use of inclusive language, examples, and experiences in instruction and training.

Sustainability and Long-Term Effects of Student-Centered Education

Sustainability and long-term effects on student-centered education. Sustainability and long-term effects are critical considerations when assessing the impact and efficacy of student-

centered education. Sustainability in student-centered education entails practices, approaches, and results that can be sustained over time to ensure constant improvement and long-term learning outcomes, student success, and societal well-being. Long-term impacts are defined as the benefits, outcomes, and transformational effects that student-centered education may have on learners, educational systems, and communities for many years (Sudarman & Ardian, 2021). One of the key dimensions of sustainability in student-centered education is the creation of lifelong learning skills, abilities, and attitudes that allow learners to adapt, learn, and flourish in a changing world. Student-centered approaches focus on critical thinking, problem-solving, inventiveness, collaboration, communication, and self-regulation are all lifelong abilities that may be easily shifted between several personal, professional, and societal contexts (Dada et al., 2023). Through the acquisition of a growth-oriented attitude, students are curious, resilient, and able to manage change and challenges, and education fosters a lifelong learning.

Moreover, the sustainability in student-centered education also involves sustainability oriented towards future generations. This means that sustainability extends deep in the future, even in generations to come. It also covers creating learning environments, systems, and cultures that guarantee equity, inclusion, diversity, and social justice. Student-centered education ensures that all learners have equal access to high-quality education, that all learners, regardless of their identities, backgrounds, and perspectives, are honored and represented well in the learning environment, and, finally, all learners get tik engaging, participating, and representing opportunities (Katawazai, 2021). Notably, by removing the systemic barriers, biases, and inequalities between students, student-centered education contributes to just, inclusive, and sustainable societies. Therefore, every person has an opportunity to develop and use their full potential to give back to the community significantly and positively. Research by Freire and Ladson-Billings shows how social justice is achieved through student-centered practices. Furthermore, sustainability in student-centered education is also about a culture of innovation and inquiry in education. In other words, student-centered education focuses on the creation of a self-renewing and continuously improving future education (Shehata et al., 2023). On that note, sustainability concerns evolutionary instructional strategies, policy settings, educational management systems and new curriculum models, and improved teaching and learning.

Finally, sustainability in student-centered education includes the development of partnerships, networks, and alliances to sustain and lead to further student-centered practices, research, and advocacy (Dakovic & Zhang, 2020). Collaboration among educators, schools, communities, businesses, non-profit organizations, and governmental organizations develops the quality and competency of student-centered education, enables knowledge dissemination, human resource development, resource encampment, and cooperative reform efforts. As a result, student-centered education and lifelong learning create synergy and long-term durability, enabling sustainable high-quality, fair, and inclusive education for all.

Conclusion

Key Findings and Research Gap

The results of the systematic literature review on the effectiveness of student-centered teaching and learning presented several key findings and highlighted some significant gaps. Firstly, the review showed that the reviewed studies provided consistent evidence that student-centered methods were able to significantly improve the academic performance of

primary school children. This was achieved through creating a deeper understanding of content from active learning and engagement, teaching students to think critically and solve problems. Moreover, all studies showed that student-centered learning improved the degree of student involvement and motivation through active participation in the learning process. This learning method was also found most effective with regards to the diversity of student types and learning inequalities.

Secondly, the review also reported positive effects of student-centered methods on improving students' social and emotional wellbeing. Students were made to work in groups and sometimes in pairs. Moreover, through interactive discussions, the methods made students feel responsible for their actions and outcomes. Lastly in this part, the studies reported that the methods created a more inclusive and positive classroom environment. Teachers claimed that students feel part of the learning process and therefore support each other. However, the review also identified several research gaps that must be addressed in future studies. Firstly, there is inadequate empirical research including longitudinal research to determine long-term effects of student-centered on primary academic performance. Most studies were based on minimal-term impacts which may not give more information. Again, no studies included both the advantages and disadvantages of implementing student centred transdisciplinary approaches claimed as its challenges. Most of these challenges are experienced in low resources set-up schools. Additionally, there are no studies on cultural relativism impact on the methodology. None of the existing studies has focussed on a cultural factor that can help explain after considering different cultures' successful importance. To conclude, student-centered teaching and learning practices work well in primary education. However, these findings call for more research to understand the long-term effects, identify implementation barriers, and determine the features of student-centered practices that must be modified before applications. Filling these gaps would not only inform the current perspective but increase the effectiveness of the student-centered concept in a broad range of educational systems and help improve the learning outcomes for all students.

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