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The Impact of Teacher Professional Development and School Climate and Culture on Innovative Student-Centered Teaching for 21st Century Skills: The Mediating Roles of Collaborative Planning and Community Engagement

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ABSTRACT

This study explores the intricate relationship between teacher professional development, the adoption of innovative student-centered teaching methods, and the enhancement of 21st-century skills among students. Drawing data from 63 schools across Indonesia, Kyrgyzstan, and Tanzania, our research investigates how teacher professional development initiatives and school climate and culture influence the extent to which educators integrate innovative teaching strategies that foster critical thinking, creativity, communication, collaboration, and digital literacy skills among students. Data were collected from 383 teachers, being 141 from Indonesia, 130 from Kyrgyztan, and 112 from Tanzania. Quantitative analysis, conducted using SPSS and Smart PLS, was used to explore the direct impact of professional development on teacher practices and the mediating roles of collaborative planning and community engagement in this relationship. The study revealed that professional development significantly influences innovative student-centered teaching across all participating countries, underscoring the pivotal role of continuous teacher training in fostering 21st-century educational practices. School climate and culture were also found to positively impact innovative teaching and collaborative planning, although the effect varied slightly across different contexts. Notably, collaborative planning and community engagement emerged as significant mediators in the relationship between professional development, school climate, and innovative teaching, highlighting the importance of an integrated educational approach. Cross-country comparisons revealed no significant differences, suggesting the universal relevance of these findings across diverse educational settings. These results support NAMA's Theory of Change which underscores the importance of collaborative planning and community engagement as crucial facilitators of effective professional development efforts aimed at advancing student-centered teaching and preparing students for success in the 21st century.

Keywords: *Teacher Professional Development, Innovative Student-Centered Teaching, 21st Century Skills, Collaborative Planning, Community Engagement.*

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INTRODUCTION

In the ever-evolving landscape of education, the emphasis on 21st-century skills has become paramount, reflecting the need to equip students with competencies that transcend traditional academic knowledge. This study delves into the effects of extracurricular involvement and community & school citizenship on the acquisition of 21st-century skills among secondary students in three diverse countries—Indonesia, Kyrgyzstan, and Tanzania. Additionally, it investigates the mediating role of perceptions of positive pedagogical practices in shaping this relationship. The geographical focus on countries where the NAMA Foundation is actively engaged adds a contextual layer to the exploration, acknowledging the influence of cultural nuances on educational dynamics.

Background

The imperative to foster 21st-century skills in the educational landscape is well-recognized (Hattie, 2016). Extracurricular involvement and a sense of community and school citizenship are identified as catalysts for skill development beyond the conventional classroom setting (Denhardt & Denhardt, 2015). These activities provide practical platforms for students to enhance problem-solving and interpersonal skills (Furco, 1996). Cultivating a sense of belonging and responsibility aligns with the broader goals of 21st-century education (Lu, Bridges & Hmelo-Silver, 2014).

NAMA Foundation's initiative to transform Muslim educational institutions in Indonesia, Kyrgyzstan, and Tanzania underscores the importance of exploring the effects of extracurricular involvement and community & school citizenship on 21st-century skill acquisition (González-Pérez & Ramírez-Montoya, 2022). Understanding these factors within the specific cultural and educational milieus represented by the NAMA Foundation's engagement is crucial for developing contextually relevant programs. Recognizing the impact of contextual differences on the relationship between extracurricular involvement, community & school citizenship, and the acquisition of 21st-century skills is pivotal for tailoring effective educational strategies (Goleman, 2020).

In today's rapidly evolving world, education faces the challenge of preparing students for an uncertain future. The acquisition of 21st-century skills is crucial for students to thrive in a dynamic landscape. This review explores innovative pedagogical approaches that empower learners and facilitate the development of essential competencies.

The Organization for Economic Co-operation and Development (OECD) envisions education in 2030 as a platform for nurturing learners who possess the skills to address complex challenges. These skills extend beyond traditional academic knowledge and include critical thinking, problem-solving, collaboration, digital literacy, and adaptability. Well-being, sustainability, and empathy are also emphasized (Herodotou et al., 2019; Toumainen, 2023; Scott, 2015). Innovative pedagogies are usually selected based on five dimensions: relevance to educational theories by aligning with established educational theories; are supported by empirical evidence supporting the effectiveness of proposed pedagogies; directly contribute to skill development; use novel approaches that break away from traditional methods; and these pedagogies are implemented in educational settings.

Among the best innovative pedagogies that have been implemented worldwide is the technique of formative analytics which leverages data to provide real-time feedback to learners. It enhances personalized learning experiences by identifying areas for improvement and tailoring instruction (Herodotou et al., 2019; Bizami, 2023; Gonzalez-Perez, 2022). The technique of teachback encourages students to explain concepts in their own words. By teaching others, learners consolidate their understanding and develop communication skills (Herodotou et al., 2019). Place-based learning connects learning to real-world contexts. Students explore local environments, fostering a deeper understanding of their surroundings and promoting environmental awareness (Herodotou et al., 2019). Lately, some schools have introduced learning with drones and robots. Integrating drones and robots into the curriculum engages students in hands-on, interdisciplinary activities. They learn programming, problem-solving, and teamwork while exploring cutting-edge technologies (Herodotou et al., 2019; Gonzalez-Perez, 2022). Citizen inquiry, which involves students in scientific investigations, has also been adopted by some innovative schools. They collect data, analyze findings, and contribute to real

research projects. This approach nurtures curiosity, critical thinking, and scientific literacy (Herodotou et al., 2019). Innovative pedagogies hold immense potential for transforming education. By embracing these approaches, educators can empower secondary students to acquire 21st-century skills, preparing them to thrive in an ever-changing world (Chalkiadaki, 2018; Department of Education and Skills, 2003; Kivunja, 2014).

Student-Centered Teaching in Third-World Secondary Schools

Third-world or developing countries often face unique challenges in their education systems. These challenges include overcrowded classrooms, limited resources, outdated curricula, and socioeconomic disparities. Despite these obstacles, student-centered teaching can play a transformative role. Student-centered teaching shifts the focus from the teacher as the sole knowledge provider to a facilitator who guides students' learning. Here are some essential principles: 1) Curriculum with Explicit Learning Outcomes: Clearly defined learning objectives help students understand what they are expected to learn. These outcomes guide instructional planning and assessment. 2) Learning Outcomes Centered on the Student: Recognizing individual student needs and tailoring instruction accordingly is crucial. Students should actively participate in setting their learning goals. 3) Diverse Pedagogical Approaches: Student-centered teaching embraces various methods, such as: Inquiry-Based Learning: Encourages exploration, critical thinking, and problem-solving; Service-Learning: Integrates community service with academic learning; Collaborative and Peer-to-Peer Learning: Promotes teamwork and communication skills; Differentiated Instruction: Adapts teaching to accommodate diverse learning styles; Technology-Enhanced Learning: Utilizes digital tools for engagement; and Multifaceted Assessment: Assessment should go beyond traditional exams. It includes formative assessments, project-based evaluations, and constructive feedback.

In Tanzania, efforts have been made to implement student-centered approaches in secondary schools (Kivunja, 2014; Rugambwa & Mwaikokesya, 2022). These initiatives focus on: Active Learning: Teachers encourage students to explore topics, ask questions, and engage in discussions; Problem-Solving: Students work on real-world problems

relevant to their context; Collaboration: Group projects and peer learning enhance collaboration skills; and Student Agency: Students take ownership of their learning, setting goals and monitoring progress. Research shows that student-centered teaching positively impacts learning outcomes, motivation, and retention. However, challenges persist in the following areas: Teacher Training: Educators need professional development to adopt student-centered practices effectively. Infrastructure: Access to technology and teaching materials remains a challenge. Assessment Alignment: Traditional exams may not align with student-centered approaches (Kivunja, 2014; Rugambwa & Mwaikokesya, 2022).

In Indonesia, efforts have been made to implement student-centered approaches in secondary education. One notable study evaluated the efficacy of a designed student-centered instructional (DSCI) program for teaching about acids and bases (Sri Rahayu et al., 2011). The teaching innovation was based on constructivist, hands-on inquiry, and context-based approaches. The program was implemented with a class of grade 11 students from a public senior high school in Indonesia. Another class from the same school was instructed using a traditional teacher-centered approach. The results of this study revealed several important outcomes. First was improved understanding whereby the student-centered approach effectively enhanced students' understanding of acid-base concepts. There was a significant difference in posttest mean scores between the experimental group (using the DSCI program) and the comparison group (using the traditional approach) (Sri Rahayu et al., 2011). Secondly, there was increased interest. Students in the experimental group showed increased interest in learning science. This was evident through positive perceptions of their engagement, competence in inquiry activities, and favorable views of the learning environment. Thirdly, they had positive outcome expectations. Students believed that the student-centered approach would lead to positive outcomes in their learning journey (Sri Rahayu et al., 2011. See also Huda & Lubis, 2019; Karmina et al., 2021; and Keiler, 2018).

Another example is Kyrgyzstan which, like many other countries, faces unique challenges in its education system. These challenges include limited resources, outdated curricula, and socioeconomic disparities. Despite these obstacles, educators in Kyrgyzstan have been working to implement student-centered teaching approaches. A comprehensive situational analysis was conducted in 20

general secondary schools across Kyrgyzstan. The study involved data collection from teachers, students, school directors, and parents through questionnaires and interviews (University of Central Asia, 2021). This study, and similar studies in the region have uncovered a number of interesting findings. Educators recognize the importance of student-centered approaches but often struggle with implementation due to large class sizes and limited resources. Students respond positively to interactive and participatory methods (University of Central Asia, 2021; De La Sablonniere et al, 2009; and Kerimbayev et al., 2023). They appreciate opportunities to express their opinions and collaborate with peers. Regarding curricular adaptation, some schools have adapted curricula to incorporate project-based learning, inquiry-based activities, and real-world problem-solving. Teacher training programs are essential for equipping educators with the skills needed to implement student-centered practices effectively. While progress is being made, several challenges persist in the following areas: a) Infrastructure and access to technology and teaching materials remains a concern, b) assessment alignment whereby traditional exams may not fully align with student-centered approaches, and c) community support in that involving parents and local communities is crucial for sustaining these changes (University of Central Asia, 2021; De La Sablonniere et al, 2009; Kerimbayev et al., 2023 and Newman & Gentile, 2020).

What we learn from the above examples is that despite challenges, there are inspiring success stories. Teachers encourage students to explore topics, ask questions, and engage in discussions, thus emphasizing active learning. Project-Based Learning is implemented when Students work on community projects, connecting classroom learning to real-world issues. Finally, student agency is emphasized when students take ownership of their learning, setting goals and reflecting on their progress.

The above examples show that student-centered teaching, even in third-world contexts, empowers students to become active learners, critical thinkers, and problem solvers. By embracing these pedagogies, educators can bridge gaps and prepare students for a rapidly changing world (Toumainen, 2023). The success of student-centered teaching lies in collaboration among teachers, students, and the community. To further promote student-centered teaching, the following are recommended: Advocacy by raising awareness among policymakers, parents, and

communities about the benefits of these approaches. Resource allocation whereby resources are strategically allocated to support teacher training and classroom materials. Moreover, there is a need to continue research on effective practices and collaborate with international partners.

The role of parent and community engagement

Parent and community engagement play a pivotal role in shaping the effectiveness of student-centered pedagogies. Parent and community involvement impacts teachers and the learning environment in different ways. First, is enhanced understanding of students. When educators engage with parents and communities, they gain insights into the context, unique gifts, and individual learning styles of the students they serve (Rodriguez, 2010; Mozolic & Schuster, 2016; Abizada et al., 2020; and Ailincai et al., 2016). It also helps in understanding students' backgrounds and motivations allows teachers to tailor their instruction more effectively. Secondly, teaching practices are enhanced. This is by seeking connections with families and the broader community, teachers become part of a dynamic community of learners. This engagement enriches teaching by providing diverse perspectives, cultural insights, and real-world context for learning (Rodriguez, 2010; deCastro & Pereira, 2019; Delfino, 2019; Duarte et al., 2023; Estevez et al., 2021; Fernandez et al, 2018). Thirdly, there is improved student achievement. Increased family and community engagement correlates with faster literacy acquisition, higher rates of promotion to secondary education, and reduced school dropout rates. When parents actively participate, students feel supported and motivated to succeed. Fourthly, there is partnership in learning whereby parents can reinforce classroom learning at home, extending the impact of student-centered approaches. Community involvement provides additional resources, mentorship, and opportunities for experiential learning. Finally, teachers who collaborate with parents and communities are better equipped to address diverse student needs. The collective wisdom of parents as a child's first teachers enhances educators' ability to unleash each child's learning potential1. In short, parent and community engagement not only benefits students but also empowers teachers to create meaningful, student-centered learning experiences (Chen et al., 2020; deCastro & Pereira, 2019; Delfino, 2019; Duarte et al., 2023; Estevez et al., 2021; Fernandez et al, 2018; Gemeay et al., 2015).

Encouraging parent and community participation is essential for creating a vibrant and effective student-centered learning environment. Effective teachers and school systems employ a plethora of strategies to encourage parent and community participation in school activities (deCastro & Pereira, 2019; Delfino, 2019). Some teachers regularly communicate with parents and community members through newsletters, emails, or parent-teacher conferences. They share information about classroom activities, learning goals, and student progress. Effective teachers invite parents to participate in school committees, advisory boards, or parent-teacher associations. They also seek their input on curriculum choices, extracurricular activities, and school policies. Some schools organize workshops on topics such as effective study habits, digital literacy, or parenting skills. They provide training sessions for parents to understand student-centered approaches and how they can support their child's learning (Aslan & Kosir, 2021; Delfino, 2019; Duarte et al., 2023; Estevez et al., 2021). Some schools engage parents and community members in school events, science fairs, art exhibitions, or cultural celebrations. They encourage joint projects where students, parents, and community members work together. It also includes fostering strong relationships by visiting students' homes or attending community gatherings, which helps to understand the context in which students live and learn. It is also good to create platforms (such as exhibitions, websites, or newsletters) to showcase student projects and achievements and involve parents and community members in celebrating student success. Good schools also collaborate with local organizations, businesses, and experts to enhance learning experiences. They tap into community resources for field trips, guest speakers, or mentorship programs. Finally, it is good to invite parents to volunteer in classrooms, libraries, or school events. Their active involvement benefits both students and the school community. When parents and communities actively participate, the entire learning ecosystem thrives, and student-centered education becomes more impactful (Rodriguez, 2010; Abizada et al., 2020; Ailincai et al., 2016; Altuntas & Sezer, 2017; Chen et al., 2020; deCastro & Pereira, 2019; Delfino, 2019; Fernandez et al, 2018; Gemeay et al., 2015; Isik & Bahat, 2021).

School culture and climate significantly influence the adoption and effectiveness of student-centered pedagogies. The impact school culture and climate on teacher use of student centered pedagogies is manifested in a number of ways. Firstly, a supportive and positive school culture fosters collaboration, trust, and shared values among staff, students, and parents. Teachers in such environments feel empowered, motivated, and connected to a larger purpose. When teachers believe in the school's mission and feel valued, they are more likely to embrace innovative teaching methods, including student-centered approaches (Starkey, 2023; Chapa et al., 2014; Kalman et al., 2019). Secondly, a healthy school culture encourages collaboration among teachers. When educators work together, share ideas, and learn from one another, they are more open to trying new instructional strategies. Student-centered pedagogies thrive in an environment where teachers collaborate on designing engaging learning experiences (Starkey, 2023; Nduku, 2019).

School leaders play a crucial role in shaping culture and climate. Supportive leaders who prioritize student-centered learning create an atmosphere where teachers feel encouraged to experiment, take risks, and adapt their teaching methods. Conversely, a negative or rigid climate stifles innovation and hinders the adoption of student-centered practices (Kalman et al., 2019; McChesney, 2023; Muhsin & Indartono, 2020; Rauf et al., 2018; and Lo, 2023). Moreover, a culture that values teacher autonomy allows educators to tailor their instruction to student needs. When teachers feel trusted and respected, they are more likely to explore creative teaching approaches. Student-centered pedagogies require flexibility, and a trusting climate enables teachers to make instructional decisions based on their students' unique contexts (Starkey, 2023; Kalman et al., 2019; McChesney, 2023; Nduku, 2019; Prifti & Rapti, 2018; Rauf et al., 2018; Lo, 2023). Besides, a strong school culture aligns with a shared vision for student success. When everyone—teachers, administrators, parents, and students—agrees on the importance of 21st-century skills and personalized learning, student-centered practices become integral to achieving that vision. Lastly, a positive climate celebrates diversity and promotes inclusive practices (Chapa et al., 2014; McChesney, 2023; Kosir et al., 2023; Nduku, 2019; Prifti & Rapti, 2018; Rauf et al., 2018; and Lo, 2023). Teachers who value diverse perspectives are more likely to adopt student-centered approaches that honor individual differences and cultural backgrounds3

(Lo, 2023). In short, a nurturing school culture and positive climate create an environment where student-centered pedagogies can flourish. When teachers feel supported, empowered, and part of a collaborative community, they are better equipped to implement innovative teaching methods that benefit all students.

School culture and teacher professional development

The school culture significantly influences teachers' professional development. A supportive and positive school culture fosters collaboration, trust, and shared values among staff, students, and parents. Teachers who feel valued and part of a positive community are more likely to engage in professional development opportunities. A healthy school culture encourages collaboration among teachers (Nduku, 2019). When educators work together, share ideas, and learn from one another, they enhance their professional skills. Teachers in a collaborative culture are more open to trying new instructional strategies and attending workshops or training sessions. School leaders play a crucial role in shaping culture and climate. Supportive leaders who prioritize professional development create an atmosphere where teachers feel encouraged to learn and grow. Conversely, a negative or rigid climate hinders teachers' willingness to engage in development activities (Lo, 2023). A culture that values teacher autonomy allows educators to tailor their learning experiences. When teachers feel trusted and respected, they are more likely to explore creative teaching approaches. Professional development becomes more effective when teachers have autonomy over their learning paths. A strong school culture aligns with a shared vision for student success. When everyone—teachers, administrators, parents, and students—agrees on the importance of continuous learning, professional development becomes integral to achieving that vision (Nduku, 2019; Prifti & Rapti, 2018; Rauf et al., 2018; and Lo, 2023). In a nutshell, a nurturing school culture enhances teacher professional development, leading to improved teaching practices and better student outcomes.

The role of continuous professional development in teacher use of effective student centered pedagogies

Continuous professional development (CPD) plays a crucial role in enhancing teachers' ability to implement effective student-centered pedagogies. CPD provides teachers with opportunities to learn new teaching methods, strategies, and approaches (Tang et al., 2022). When teachers engage in ongoing learning, they become better equipped to design student-centered lessons that cater to diverse learners. Effective CPD deepens teachers' understanding of student-centered practices. Teachers explore research-based approaches, gain insights into student needs, and refine their instructional techniques. Moreover, CPD focuses on building specific skills needed for student-centered teaching. They also learn how to facilitate inquiry-based learning, promote collaboration, and personalize instruction (Darling-Hammond et al., 2017). Since student-centered pedagogies require shifts in classroom dynamics, CPD helps teachers adapt to these changes, fostering a supportive environment for student engagement and active learning. Besides, CPD encourages teachers to reflect on their teaching practices. Through self-assessment and feedback, teachers refine their student-centered approaches. When all these are done, research shows that effective CPD positively influences student outcomes. When teachers embrace student-centered methods, students benefit from deeper understanding, critical thinking, and collaboration (Tang et al., 2022). Thus, continuous professional development empowers teachers to create dynamic, student-centered classrooms where learning thrives.

Continuous Professional Development (CPD) has been used to enhance teaching practices in poor schools across Asia and Africa. In Asia, Bangladesh, India, and Pakistan have implemented CPD programs to address the unique challenges faced by teachers in resource-constrained settings. In Bangladesh, CPD initiatives focus on improving pedagogical skills, classroom management, and student engagement. Teachers participate in workshops, peer learning, and action research (Singh et al., 2021). India has launched CPD programs that emphasize technology integration, student-centered approaches, and inclusive education. Teachers receive training on using digital tools, creating interactive lessons, and adapting content for diverse learners (Singh et al., 2021). In Pakistan, CPD efforts target teachers in rural and underserved areas. These programs provide training on active learning, formative assessment, and community engagement. Teachers learn to

adapt their teaching methods to local contexts and student needs (Singh et al., 2021). For Africa, Sub-Saharan Africa faces significant educational challenges, including teacher shortages, large class sizes, and limited resources. CPD programs in countries like Kenya, Nigeria, and Uganda focus on: 1) inclusive education where teachers are trained to support students with disabilities or special needs. There is a focus on literacy and numeracy by enhancing teachers' skills in foundational subjects. Interactive teaching methods are used to encourage student participation, critical thinking, and problem-solving. Lastly, community engagement is applied, by involving parents and local communities in education (Fekede, 2017; Kalman et al., 2019; and Luyten & Bazo, 20191). From the above examples, it is clear that effective CPD positively influences teaching practices and student outcomes. When teachers engage in continuous learning, they become better equipped to create student-centered classrooms, even in challenging environments. Hence, CPD programs tailored to the specific needs of poor schools in Asia and Africa empower teachers, improve instructional quality, and ultimately benefit students (Tang et al., 2022 Singh et al., 2021).

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Research Gap and Purpose of the Study

The above review demonstrates the significance of understanding the interplay of using innovative student-centered pedagogies that can facilitate the achievement of 21st century skills, continuing professional development, positive school cultures and climates and parent and community engagement. In the context of NAMA's work in three diverse countries in Southeast Asia, Central Asia and Africa, this not merely an academic exercise but a crucial step towards equipping Muslim youth with the skills necessary for success in the 21st century.

The specific objectives of the study using structural equation modeling (SEM) with Partial Least Squares (PLS) approach were as follows: 1) To assess the validity and reliability of the instruments used in the study by examining factor loadings, convergent validity, and discriminant validity. 2) To investigate the direct impact of Professional Development on Innovative Student-centered Teaching for 21st Century Skills. 3) To explore the direct impact of School Climate and Culture on Innovative Student-centered Teaching for 21st Century Skills. 4) To examine the direct impact of Professional Development on Collaborative

Planning and Community Engagement. 5) To analyze the direct impact of School Climate and Culture on Collaborative Planning and Community Engagement. 6) To evaluate the direct impact of Collaborative Planning and Community Engagement on Innovative Student-centered Teaching for 21st Century Skills. 7) To investigate the mediating role of Collaborative Planning and Community Engagement in the relationship between Professional Development and Innovative Student-centered Teaching for 21st Century Skills. 8) To explore the mediating role of Collaborative Planning and Community Engagement in the relationship between School Climate and Culture and Innovative Student-centered Teaching for 21st Century Skills. 9) To compare the effects of Professional Development, School Climate and Culture, and Collaborative Planning and Community Engagement on Innovative Student-centered Teaching for 21st Century Skills across different countries (Indonesia, Kyrgyzstan, & Tanzania).

The above objectives were reflected in the following hypotheses: H1: The instruments used in the study enjoy sufficient validity and reliability (factor loadings, convergent validity, & discriminant validity). H2: There is a significant positive impact of Professional Development on Innovative Student-centered Teaching for 21st Century Skills. H3: There is a significant positive impact of School Climate and Culture on Innovative Student-centered Teaching for 21st Century Skills. H4: There is a significant positive impact of Professional Development on Collaborative Planning and Community Engagement. H5: There is a significant positive impact of School Climate and Culture on Collaborative Planning and Community Engagement. H6: There is a significant positive impact of Collaborative Planning and Community Engagement on Innovative Student-centered Teaching for 21st Century Skills. H7: Collaborative Planning and Community Engagement mediate the relationship between Professional Development and Innovative Student-centered Teaching for 21st Century Skills. H8: Collaborative Planning and Community Engagement mediate the relationship between School Climate and Culture and Innovative Student-centered Teaching for 21st Century Skills. H9: There are significant differences in the effects of Professional Development, School Climate and Culture, and Collaborative Planning and Community Engagement Innovative on Student-centered Teaching for 21st Century Skills among different countries (Indonesia, Kyrgyzstan, & Tanzania). These are reflected in Figure 1.

Figure 1: Conceptual Framework

By addressing these questions and hypotheses, this study endeavored to provide evidence-based insights that can contribute to the ongoing discourse on effective educational strategies, particularly within the distinct cultural and geographical contexts represented by Indonesia, Kyrgyzstan, and Tanzania.

METHOD

To test the research hypotheses of the study, we used a cross-sectional survey implemented in the three countries (Indonesia, Kyrgyzstan and Tanzania). The study applied the Partial Least Square Structural Equation Modeling (PLS-SEM) technique using Smart PLS-4. PLS-SEM represents a well-substantiated method for estimating complex cause-effect-relationship models in social science research (Hair et al., 2014). The study utilized convenience sampling technique. The study sample comprised of students from each of the 63 schools in those three countries where NAMA foundation intervention programs are being implemented. The total sample was 383 teachers, being 141 from Indonesia, 130 from Kyrgyzstan, and 112 from Tanzania. In PLS-SEM, the guideline is that the sample size should be ten times the number of arrows pointing at a variable (Hair et al., 2014). In the present study, there are in total 5 arrows pointing to the variables in the conceptual model. Hence, the requirement for representativeness would be 50 valid surveys. The sample size in the present study is well above the required level in each of the countries. The questionnaires were distributed in English in Tanzania (English is one the two official languages for communication

in this country). In Indonesia, the questionnaire was distributed in both English and Indonesian (Bahasa Indonesia). Similarly, in Kyrgyzstan, the questionnaire was distributed in both English and Kyrgyz. The translations into Indonesian and Kyrgyz were made by certified consultants and verified by academic experts of those languages.

The items used in this study were selected from a large dataset collected by NAMA foundation for the purpose of evaluating its programs. These self-constructed surveys focused on three main areas namely, school life, learning success, and culture and values. In the present study, only items from the learning success and culture and values domains that were deemed to represent our constructs of interest were analyzed. In the first part of the questionnaire, demographic questions were asked including country, school, age, and gender. In the second part, items for measuring professional development (PD), School climate and culture (SC), Collaborative planning and community engagement (PSI) and Innovative Student Centered Teaching (ISCT) were included. Items were measured with 5-point Likert-scales where 1 meant strong disagreement and 5 meant strong agreement. Table 1 shows the items that were included in each variable.

Table 1. Scale Items

Professional Development (PD)	
LST31	I attend professional development activities (conferences, seminars/webinars,
	training sessions ...) during the year
LST32	My professional development is related to my teacher development plan and my own areas of improvement.
LST33	Teachers in my school observe each other's classrooms and provide feedback to
	their fellow teachers on what they observed
School Climate and Culture (SC)	
CVT11	I engage in solving problems that arise at school (involving students, teachers,

	administration, parents...)
CVT12	Our students have the ability to solve their own problems
CVT13	I feel safe at school to disagree with the decisions made by the administration
CVT21	Our students model the core values of our school.
CVT22	The assessment practices at school are fair to all students.
CVT23	The staff in our school rely on one another to help them overcome their problems.
Collaborative Planning and Community Engagement (PSI)	
SLT11	I involve my students in out-of-classroom activities and events
SLT12	I plan learning activities with my fellow teachers at school
SLT21	When planning learning activities, I engage families/the community
SLT22	Engaging parents/the community in school activities helps students in their learning
Innovative on Student-centered Teaching (ISCT)	
LSS21	I supplement the teaching textbooks with material from other sources (internet,
	other books, ...).
LSS22	What students learn is useful in their lives; it is related to their own experiences
	and real lives.
LSS23	Learning through projects and finding solutions to problems is part of the
	curriculum I teach to my students
LSS25	My students work in teams (not group work only) collaboratively.

RESULTS AND DISCUSSION

Introduction

This section presents the findings from a cross-sectional survey conducted across Indonesia, Kyrgyzstan, and Tanzania, utilizing Partial Least Square Structural Equation Modeling (PLS-SEM) to explore the interrelations between professional development, school climate, collaborative planning, and innovative teaching methods. The reliability and validity of these constructs were rigorously assessed, setting the stage for an in-depth examination of the hypothesized relationships within this educational context.

Reliability and validity

The reliability of the variables was tested using Cronbach's Alpha and Composite Reliability (CR). Initially, the overall sample was assessed and items having factor loadings that were smaller than 0.600 were discarded. The results for reliability and validity along with the factor loadings for the remaining items are presented in Table 1 for the overall sample and for each country-specific sample. All the Alpha values and CRs for the overall sample were higher than the recommended value of 0.700. There were variations in the Alpha values and CRs for individual countries (i.e., Indonesia, Kyrgyzstan and Tanzania). The Average Variance Extracted (AVE) and CRs were all higher or close to 0.500 and 0.700, respectively, which indicates that the measures had adequate convergent validity. (See Appendices 1-4 for the model diagrams of Indonesia, Kyrgyzstan, Tanzania and the overall sample).

Discriminant validity was assessed through cross-loadings. Multicollinearity was also assessed, with the value of each indicator's Variance Inflation Factor (VIF) being less than 5 (see Appendix 5).

Additionally, discriminant validity was also assessed by using cross-loadings. Appendix 6 shows the cross-factor loadings of all the items. It is observed that all the factor loadings were greater than their cross-loadings, which is a sign of discriminant validity.

Thirdly, discriminant validity was also tested using the criterion suggested by Fornell & Larcker and the Heterotrait-Monotrait Method (HTMT). The results of both tests are presented in Table 2. Both the Fornell & Larcker criterion and the Heterotrait-Monotrait Method (HTMT) results indicated that the measures used in the study enjoyed acceptable discriminant validity.

Table 2: Discriminant validity using the criterion by Fornell & Larcker and Heterotrait- Monotrait Method (HTMT)

	ISCT	PD	PSI	SC
ISCT	*0.636*	0.789	0.591	0.565
PD	0.532	*0.738*	0.777	0.703
PSI	0.426	0.479	*0.678*	0.694
SC	0.433	0.411	0.451	*0.620*
Indonesia				
ISCT	*0.585*	0.745	0.905	0.543
PD	0.498	*0.735*	0.820	0.573
PSI	0.458	0.395	*0.590*	0.734
SC	0.396	0.374	0.392	*0.614*
Kyrgyzstan				
ISCT	0.754	0.828	1.039	0.757
PD	0.669	0.818	0.886	0.712
PSI	0.785	0.620	0.698	0.810
SC	0.673	0.531	0.628	0.701
Tanzania				
ISCT	*0.723*	0.832	0.830	0.719
PD	0.652	*0.803*	0.874	0.729
PSI	0.628	0.609	*0.709*	0.788
SC	0.575	0.534	0.553	*0.660*
Overall Sample				

Structural model

The next step in our analysis was to assess the hypothesized relationships. First, direct relationships were tested. Results from this analysis are presented in detail in Table 3. The results for Indonesia are presented first, followed by the results for Kyrgyzstan, then the results for Tanzania, and finally the results for the overall sample. The findings presented in Table 3 show that all of the hypotheses of the study were positively and significantly supported for the overall sample.

Table 3: Direct relationships (Hypotheses H2 to H6).

	Indonesia			Kyrgyzstan			Tanzania			Overall Sample		
	β	T	P	β	T	P	β	T	P	β	T	P
PD -> ISCT	0.377	4.379	0.000	0.339	3.312	0.001	0.241	3.415	0.001	0.357	7.378	0.000
PD -> PSI	0.354	4.121	0.000	0.288	3.314	0.001	0.399	5.054	0.000	0.439	10.106	0.000
PSI -> ISCT	0.147	1.627	0.104	0.261	2.871	0.004	0.486	6.401	0.000	0.285	5.932	0.000
SC -> ISCT	0.209	2.179	0.029	0.163	1.752	0.080	0.240	2.779	0.005	0.227	4.837	0.000
SC -> PSI	0.305	3.615	0.000	0.285	3.371	0.001	0.416	5.197	0.000	0.318	6.858	0.000

SC = School Climate & Culture; PD = Professional Development; PSI = Collaborative Planning and Community Engagement ; ISCT = Innovative Student-Centered Teaching

Secondly, the findings also reveal that the results for each country specific sample were somehow different from the findings for the overall sample. For instance, in the Indonesian sample, the results reveal that, except for PSI -> ISCT **(β=0.147, t=1.627, p=0.104), all the other hypotheses were also positive and significant. Similarly the

results for Kyrgyzstan indicated that except for SC -> ISCT (β =0.163, t=1.752, p=0.080), all the other hypotheses were also positive and significant. Finally, the results for Tanzania indicated that all of the hypotheses were also positive and significant.

Therefore, hypotheses H2-H6 are accepted for the whole sample and Tanzania, while hypotheses H6 and H3 are rejected in each country-specific samples of Indonesia and Kyrgyzstan respectively.

Mediation analysis

Results for the analysis of the mediated relationships are presented next.

Table 4: Mediation analysis (Hypotheses H7 and H8).

	Indonesia			Kyrgyzstan			Tanzania			Overall Sample		
	β	T	P	β	T	P	β	T	P	β	T	P
Total Effect PD -> ISCT	0.429	5.63	0.000	0.414	4.232	0.000	0.434	5.238	0.001	0.483	11.24	0.000
Total Effect SC -> ISCT	0.254	2.943	0.003	0.237	2.674	0.008	0.442	4.881	0.000	0.318	7.05	0.000
Direct Effect PD -> ISCT	0.377	4.379	0.000	0.339	3.312	0.001	0.241	3.415	0.001	0.357	7.378	0.000
Direct Effect SC -> ISCT	0.209	2.179	0.029	0.163	1.752	0.080	0.240	2.779	0.005	0.227	4.837	0.000
Indirect Effects												
PD -> PSI -> ISCT	0.052	1.541	0.123	0.075	2.205	0.027	0.194	3.553	0.000	0.125	5.003	0.000
SC -> PSI -> ISCT	0.045	1.388	0.165	0.074	1.904	0.057	0.202	4.953	0.000	0.091	4.522	0.000

SC = School Climate & Culture; PD = Professional Development; PSI = Collaborative Planning and Community Engagement ; ISCT = Innovative Student-Centered Teaching

The results for Indonesia are presented first, followed by the results for Kyrgyzstan, then the results for Tanzania, and finally the results for the overall sample (Table 4).

Results of mediation analysis revealed that the mediating role of PSI between PD and ISCT was significant for the overall sample as well as for Tanzania and Kyrgyzstan, but was not significant for Indonesia PD -> PSI -> ISCT (β =0.052, t=1.541, p=0.123). On the other hand, the mediating role of PSI between SC and ISCT was significant for the overall sample as well as for Tanzania, but was not significant for Indonesia SC -> PSI -> ISCT (β =0.045, t=1.388, p=0.165) and Kyrgyzstan SC -> PSI -> ISCT (β =0.074, t=1.904, p=0.057).

Multi-group analysis

As a last step in the analysis, we evaluated the significant differences that existed in the effects of Extracurricular involvement and Community & school citizenship on the Acquisition of 21st century skills among the different countries explored in the paper (i.e., Indonesia, Kyrgyzstan and Tanzania). The hypothesis H8 was tested using multi-group analysis (Table 5).

The findings revealed that the differences were only significant when comparing the Perceptions of positive pedagogical practices and Acquisition of 21st century skills between Indonesia and Kyrgyzstan (path diff= -0.142, p=0.050). All the other differences in the hypothesized relationships were found insignificant. Therefore, the hypothesis H8 was not supported by our findings. This fact shows that the outcomes of effects of Extracurricular involvement, Community & school citizenship and Perceptions of positive pedagogical practices on the Acquisition of 21st century skills quite similar in Indonesia, Kyrgyzstan and Tanzania (González-Pérez & Ramírez-Montoya, 2022).

Table 5: Multi-group comparison (Hypothesis H8).

	Path diff.(Indonesia-Kyrgyzstan)	p-value (Indonesia-Kyrgyzstan)	Path diff. (Indonesia-Tanzania)	p-value (Indonesia-Tanzania)	Path diff. (Kyrgyzstan-Tanzania)	p-value (Kyrgyzstan-Tanzania)
PD -> ISCT	0.038	0.780	0.137	0.220	0.099	0.418
PD -> PSI	0.066	0.585	-0.044	0.703	-0.111	0.345
PSI -> ISCT	-0.114	0.373	-0.339	0.004	-0.225	0.057
SC -> ISCT	0.046	0.719	-0.031	0.828	-0.077	0.543
SC -> PSI	0.020	0.860	-0.111	0.340	-0.131	0.258

SC = School Climate & Culture; PD = Professional Development; PSI = Collaborative Planning and Community Engagement ; ISCT = Innovative Student-Centered Teaching

DISCUSSION AND CONCLUSION

The present study aimed to investigate the relationships between School Climate & Culture (SC), Professional Development (PD), Collaborative Planning and Community Engagement (PSI), and teachers' use of Innovative Student-Centered Teaching (ISCT) across three diverse countries: Indonesia, Kyrgyzstan, and Tanzania. The discussion is organized into four main sections: reliability and validity, structural model, mediation analysis, and multi-group analysis.

Reliability and validity were assessed using Cronbach's Alpha, Composite Reliability (CR), factor loadings, and discriminant validity tests. The high values of Cronbach's Alpha and CR for the overall sample indicated strong internal consistency. The factor loadings for most of the items were above 0.600, meeting the recommended threshold. Discriminant validity was confirmed through cross-loadings, with all factor loadings greater than their cross-loadings, and through the Fornell & Larcker criterion and Heterotrait-Monotrait Method, demonstrating acceptable discriminant validity (Fornell & Larcker, 1981; Henseler et al., 2015).

The structural model analysis tested direct relationships, revealing significant support for hypotheses H2- H8 across the overall sample. However, variations were observed in the country-specific samples, emphasizing the importance of examining cultural nuances in educational contexts (Jokisaari, 2013). These variations were expected considering the great cultural distance among the countries participating in the study (Rahayu et al., 2011; Huda & Lubis, 2019; Karmina et al., 2021; Rugambwa & Mwaikokesya, 2022; and Kerimbayev et al., 2023).

Mediation analysis demonstrated significant mediating roles of Collaborative Planning and Community Engagement (PSI) in the relationships between School Climate & Culture (SC), Professional Development (PD) and teachers' use of Innovative Student-Centered Teaching (ISCT) for all countries (Ahmed & Mikail, 2023; Johnson et al., 2014, Klemencic, 2017). However, the mediating roles of Collaborative Planning and Community Engagement (PSI) in the relationships between Professional Development (PD) and teachers' use of Innovative Student-Centered Teaching (ISCT) was significant for Tanzania and Kyrgyzstan but not for Indonesia. On the other hand the mediating roles of Collaborative Planning and Community Engagement (PSI) in the relationships between School Climate & Culture (SC), teachers' use of Innovative Student-Centered Teaching (ISCT) was significant for Tanzania but not for Kyrgyzstan and Indonesia. This finding underscores the importance of considering contextual differences in the mediation processes within the educational systems of each country (Beni et al., 2022; Darling-Hammond et al., 2017; Fekede, 2017; Singh et al., 2021).

The multi-group analysis assessed the differences in the effects of relationships between school climate & culture (SC), professional development (PD), collaborative planning and community engagement

(PSI), and teachers' use of innovative student-centered teaching (ISCT) across three diverse countries: Indonesia, Kyrgyzstan, and Tanzania. All of the hypotheses were supported for the overall sample, but there were variations among the three countries. This suggests that while there are variations in direct relationships and mediating factors, the overall impact of school climate & culture (SC), professional development (PD), collaborative planning and community engagement (PSI), and teachers' use of innovative student-centered teaching (ISCT) is quite similar across Indonesia, Kyrgyzstan, and Tanzania (Muhsin & Indartono, 2020; Nduku, 2019; Darling-Hammond et al., 2017; Fekede, 2017; and Singh et al., 2021)

For hypothesis H2 (Professional Development on Innovative Teaching), there was a significant impact across all samples. Professional development serves as a cornerstone for fostering innovative student-centered teaching practices, echoing Denhardt & Denhardt's (2015) findings on its catalytic role in skill development. Continuous professional development, as highlighted by Tang et al. (2022), empowers educators to implement pedagogies that resonate with 21st-century learning paradigms, further substantiated by Singh et al. (2021) in the context of resource-constrained settings in Asia and Africa.

For hypothesis H3 (School Climate and Culture on Innovative Teaching), there was significant impact, except for Kyrgyzstan (β =0.163, p=0.080). A conducive school climate and culture are pivotal in nurturing innovative teaching practices, reflecting Lu, Bridges, and Hmelo-Silver's (2014) advocacy for environments that support 21st-century education. The variation in significance across countries suggests that cultural and contextual factors, as discussed by Goleman (2020), play a critical role in shaping the efficacy of these educational strategies.

Regarding hypothesis H4 (Professional Development on Collaborative Planning and Community Engagement), there was a significant impact across all samples. The linkage between professional development and collaborative planning underscores the transformative potential of teacher training in fostering community engagement, aligning with the collaborative ethos emphasized by Herodotou et al. (2019). This interconnection is vital for developing educational ecosystems that are

responsive to the needs of Muslim youth, as advocated by the NAMA Foundation.

Similar results were found for hypothesis H5 (School Climate and Culture on Collaborative Planning and Community Engagement), with a significant impact across all samples. This indicates that fostering of a positive school climate and culture enhances collaborative planning and community engagement, echoing Chapa et al. (2014) and Kalman et al. (2019)'s findings on the influence of school culture on pedagogical practices. This relationship is crucial for creating inclusive educational spaces that celebrate diversity and promote innovative learning approaches.

The same applies to hypothesis H6 (Collaborative Planning and Community Engagement on Innovative Teaching), where a significant impact was found, except for Indonesia .The significant role of collaborative planning in promoting innovative teaching practices highlights the importance of community engagement in educational reform, as illustrated by Rodriguez (2010) and Mozolic & Schuster (2016). This finding reinforces the need for educational strategies that are not only student-centered but also community-oriented, ensuring a holistic approach to 21st-century skill development.

For hypothesis H7 (Mediation by Collaborative Planning and Community Engagement), significant mediation was found, except for Indonesia . The mediation effect underscores the integral role of collaborative planning in translating professional development efforts into practical teaching innovations, resonating with the principles of formative analytics and teachback techniques that foster real-time learning and peer teaching (Herodotou et al., 2019; Bizami, 2023). This mediation pathway is instrumental in contextualizing professional development within the framework of student-centered pedagogies.

For hypothesis H8 (Mediation by Collaborative Planning and Community Engagement), there was significant mediation for Tanzania, nonsignificant for Indonesia and Kyrgyzstan. The partial mediation observed in this relationship highlights the complexity of translating positive school climates into innovative teaching practices, suggesting that additional factors may play a role in this dynamic. This complexity underscores the nuanced interplay between school culture, community engagement, and pedagogical innovation, necessitating a multifaceted

approach to educational reform that considers the unique challenges and opportunities within each context.

Finally, for hypothesis H9 (Cross-country comparison), there were no significant differences found in most pathways, highlighting universal aspects of the educational strategies. The lack of significant cross-country differences suggests a universal applicability of the examined strategies, echoing the OECD's vision for education in 2030 that transcends geographical boundaries (Herodotou et al., 2019; Toumainen, 2023). However, the nuanced variations observed call for a context-sensitive adaptation of these strategies, ensuring their relevance and efficacy in addressing the specific educational needs and cultural nuances of each country involved in the study.

Implications

The study's findings underscore the critical need for culturally sensitive educational interventions. It emphasizes the pivotal role of collaborative planning and community engagement in mediating the relationships between school climate & culture, professional development, and innovative student-centered teaching across diverse countries. The robust reliability and validity assessments ensure the credibility of the study's outcomes, providing a solid foundation for educational policy and practice. The observed variations in direct relationships and mediation processes among countries highlight the necessity of tailored approaches to address contextual differences effectively. By acknowledging these variations, educators and policymakers can develop more nuanced and targeted strategies to enhance teaching practices and foster 21st-century skills development. The multi-group analysis further confirms that while specific relationships may differ across countries, the overall impact of school climate & culture, professional development, collaborative planning, and community engagement on innovative student-centered teaching remains relatively consistent. This underscores the universal importance of these factors in promoting effective teaching practices and educational outcomes worldwide.

Future Research Directions

To get a clearer idea about what is exactly happening in the communities of interest, longitudinal study designs will have to be employed. To better understand the dynamic nature of the relationships identified in this study, future research could employ longitudinal designs. Longitudinal studies would allow for the examination of how these relationships evolve over time, offering insights into the sustainability of the observed effects (Bryman, 2016). While NAMA Foundation has collected data from 2021 and 2022, the way the data is structured makes it impossible to know whether the respondents in both years are the same, and it is impossible to trace individual respondents across different time periods. Another possible area to consider is expanding the scope of cross-cultural comparisons beyond the three countries investigated in this study. This could provide a more comprehensive understanding of the cultural influences on educational dynamics. Including a more diverse set of countries would contribute to the generalizability of findings and uncover additional cultural nuances (Smith, Fischer, & Vignoles, 2011). Moreover, there is a need for further exploration of the mechanisms through which positive pedagogical practices mediate the relationships between extracurricular involvement, community and school citizenship, and the acquisition of 21st-century skills is warranted. Identifying specific teaching practices that contribute to skill development would offer practical insights for educators and policymakers (Hattie, 2009).

Limitations

Limitations of this study include the potential for measurement bias due to self-reporting and the cross-sectional design, which limits causal inference. Additionally, the generalizability of findings may be constrained by the focus on specific countries and educational contexts. Future research should incorporate longitudinal designs and diverse samples to enhance generalizability and causal inference. Despite these limitations, the study provides valuable insights into the complex relationships between school climate & culture, professional development, collaborative planning, community engagement, and innovative student-centered teaching across diverse cultural contexts. The findings underscore the importance of considering contextual factors in educational interventions and policy development. By addressing these factors, educators and policymakers can better support teachers in

fostering 21st-century skills development. Overall, this study contributes to the growing body of literature on effective educational practices and lays a foundation for further research in this area.

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REFERENCES

Abizada, A., Gurbanova, U., Iskandarova, A., & Nadirzada, N. (2020). The effect of extracurricular activities on academic performance in secondary school: The case of Azerbaijan. *International Review of Education*, *66*(4), 487-507.

Ailincai, R., Gabillon, Z., Vernaudon, J., Paia, M., & Alì, M. (2016, January). School and family involvement in educational practices in French Polynesia. In *The IAFOR International Conference on Education-Hawaii 2016* (pp. 199-215).

Al-Balushi, S. M., Ambusaidi, A. K., Al-Balushi, K. A., Al-Hajri, F. H., & Al-Sinani, M. S. (2020). Student-centred and teacher-centred science classrooms as visualized by science teachers and their supervisors. *Teaching and Teacher Education, 89*, 103014.

Al-Hinai, A. M. (2007). The interplay between culture, teacher professionalism and teachers' professional development at times of change. In *Handbook of teacher education* (pp. 41-52). Dordrecht: Springer Netherlands.

Alkouatli, C. (2018). Pedagogies in Becoming Muslim: Contemporary Insights from Islamic Traditions on Teaching, Learning, and Developing. *Religions*, 9(11), 367[1]

Altuntaş, S., Sezer, Ö. (2017). Investigating School Attachment of Secondary School Students, *Inonu University Journal of the Faculty of Education*, *18*(1), 83-97. DOI: 10.17679/inuefd.295722

Aslan, M., & Kosir, S. (2021). Survey data showing the influences of school attachment among secondary school students in Albania. *Data in Brief*, *35*, 106949.

Beni, S., Fletcher, T., Déirdre Ní Chróinín (2022). 'It's not a linear thing; there are a lot of intersecting circles': Factors influencing teachers' implementation of Meaningful Physical Education, Teaching and Teacher Education, Volume 117, 2022, 103806

Bizami, N. A., Tasir, Z., & Kew, S. N. (2023). Innovative pedagogical principles and technological tools capabilities for immersive blended learning: a systematic literature review. *Education and Information Technologies*, *28*(2), 1373-1425.

Chalkiadaki, A. (2018). A systematic literature review of 21st century skills and competencies in primary education. *International Journal of Instruction*, *11*(3), 1-16.

Chapa, M., Leon, G. D., Solis, J., & Mundy, M. A. (2014). College Readiness. *Research in Higher Education Journal*, *25*.

Chen, J., Huebner, E. S., & Tian, L. (2020). Longitudinal relations between hope and academic achievement in elementary school students: Behavioral engagement as a mediator. *Learning and Individual Differences*, *78*, 101824.

Darling-Hammond, L., Hyler, M. E., Gardner, M. (2017). *Effective Teacher Professional Development*. Palo Alto, CA: Learning Policy Institute.

de Castro, R. M., & Pereira, D. I. F. (2019). Education and attachment: Guidelines to prevent school failure. *Multimodal Technologies and Interaction*, *3*(1), 10.

De la Sablonnière, R., Taylor, D. M., & Sadykova, N. (2009). Challenges of applying a student-centered approach to learning in the context of education in Kyrgyzstan. *International Journal of Educational Development*, *29*(6), 628-634.

Delfino, A. P. (2019). Student engagement and academic performance of students of Partido State University. *Asian Journal of University Education*, *15*(1), n1.

Deng, L., Wu, Y., Chen, L., & Peng, Z. (2024). 'Pursuing competencies' or 'pursuing scores'? High school teachers' perceptions and practices of competency-based education reform in China. *Teaching and Teacher Education, 141*, 104510.

Department for Education and Skills. (2003). 21st century skills realising our potential. London: HMSO

Duarte, N. V., Linares, A., Córdova, T., Lopez, I., Wang, Y. C., & Maruyama, G. (2023). Effects of Service-Learning and Community Engagement Programs on the Academic Outcomes of Underrepresented Undergraduate Students. *Journal of Higher Education Outreach and Engagement*, *27*(2).

Estévez, I., Rodríguez-Llorente, C., Piñeiro, I., González-Suárez, R., & Valle, A. (2021). School engagement, academic achievement, and self-regulated learning. *Sustainability*, *13*(6), 3011.

Fekede, T. U. L. İ. (2017). Teachers professional development in schools: Reflection on the move to create a culture of continuous improvement. *Journal of Teacher Education and Educators*, *6*(3), 275-296.

Fernández, A. R., Revuelta, L. R., Maya, M. S., & Lasarte, O. F. (2018). The role of parental socialization styles in school engagement and academic performance. *European Journal of Education and Psychology*, *11*(2), 123-139.

Fernández-García, C. M., Rodríguez-Álvarez, M., & Viñuela-Hernández, M. P. (2021). University students and their perception of teaching effectiveness. Effects on students' engagement. *Revista de Psicodidáctica (English ed.)*, *26*(1), 62-69.

Fufa, F. S., Tulu, A. H., & Ensene, K. A. (2023). Examining the challenges of using student-centred teaching strategies in secondary schools: A qualitative approach. *Journal of Pedagogical Sociology and Psychology*, *5*(3), 61-72.

Garcia, R., Dante Tan, R., Florendo, J., & Santos, N. (2020). 21st century soft skills in student-centered learning among first-year college students: a comparative study. *International Journal of*

Recent Advances in Multidisciplinary Research, *7*(10), 6338-6341.

Gemeay, E. M., Ahmed, E. S., Ahmad, E. R., & Al-Mahmoud, S. A. (2015). Effect of parents and peer attachment on academic achievement of late adolescent nursing students-A comparative study. *Journal of Nursing Education and practice*, *5*(6), 96.

González-Pérez, L. I., & Ramírez-Montoya, M. S. (2022). Components of Education 4.0 in 21st century skills frameworks: systematic review. *Sustainability*, *14*(3), 1493.

Herodotou, C., Sharples, M., Gaved, M., Kukulska-Hulme, A., Rienties, B., Scanlon, E., & Whitelock, D. (2019, October). Innovative pedagogies of the future: An evidence-based selection. In *Frontiers in Education* (Vol. 4, p. 113). Frontiers Media SA.

Huda, M., & Lubis, A. H. (2019). Exploring the implementation of student-centered learning in EFL classrooms: Perspectives from Islamic secondary-school teachers in Indonesia. *IJELTAL (Indonesian Journal of English Language Teaching and Applied Linguistics)*, *3*(2), 187-201.

Işık, M. & Bahat İ. (2021), Analyzing School Attachment of Secondary School Students' for Regards to Various Variables. In: *Education Quarterly Reviews*, Vol.4 Special Issue 1: Primary and Secondary Education, 571-583.

Jotsov, V., Madyarova, G., Umirzakova, Z., Akramova, A., Tkach, G., Kerimbayev, N., & Beisov, N. (2023, October). The Use of Mobile Technologies in Education with an Emphasis on a Student-Centered Approach. In *2023 International Conference Automatics and Informatics (ICAI)* (pp. 140-145). IEEE.

Kálmán, O., Tynjälä, P., & Skaniakos, T. (2019). Patterns of university teachers' approaches to teaching, professional development and perceived departmental cultures. *Teaching in higher education*.

Karmina, S., Dyson, B., Watson, P. W. S. J., & Philpot, R. (2021). Teacher implementation of cooperative learning in Indonesia: A multiple case study. *Education Sciences*, *11*(05), 218.

Keiler, L. S. (2018). Teachers' roles and identities in student-centered classrooms. *International journal of STEM*

Kennedy, T. J., & Odell, M. R. (2014). Engaging students in STEM education. *Science education international*, *25*(3), 246-258.

Kerimbayev, N., Umirzakova, Z., & Shadiev, R. (2023). A student-centered approach using modern technologies in distance learning: a systematic review of the literature. *Smart Learn. Environ* **10**, 61-77. https://doi.org/10.1186/s40561-023-00280-8

Kivunja, C. (2014). Innovative pedagogies in higher education to become effective teachers of 21st century skills: Unpacking the learning and innovations skills domain of the new learning paradigm. *International Journal of Higher Education*, *3*(4), 37-48.

Knowledge, A. (2019). Improving Teaching and Learning. Retrieved from: https://www.globalpartnership.org/sites/default/files/2019-07-kix-tl-final-english.pdf

Košir, S., Aslan, M., & Lakshminarayanan, R. (2023). Application of School Attachment factors as a strategy against school dropout: A case study of public school students in Albania. *Children and Youth Services Review*, 107085.

Lekule, T. (2017). The effectiveness of learner-centred approach in teaching and learning geography in secondary schools: A case of Nkoaranga and Nasholi Secondary Schools in Arumeru.

Lo, L. (2023) 6 Ways to Make Teaching More Culturally Responsive: Educators can help all students in their classrooms feel included by using strategies focused on self-reflection and feedback. Retrieved from: https://www.edutopia.org/article/6-ways-make-teaching-more-culturally-responsive

Luyten, H., & Bazo, M. (2019). Transformational leadership, professional learning communities, teacher learning and learner centred teaching practices; Evidence on their interrelations in Mozambican primary education. *Studies in educational evaluation*, *60*, 14-31.

McCarthy, J. (2015). Student-centered learning: It starts with the teacher. *Edutopia. George Lucas Educational Foundation, September*, *9*.

McChesney, K., & Cross, J. (2023). How school culture affects teachers' classroom implementation of learning from professional development. *Learning Environments Research*, 26, 785–801[1]

Mozolic, J., & Shuster, J. (2016). Community Engagement in K-12 Tutoring Programs: A Research-Based Guide for Best Practices. *Journal of Public Scholarship in Higher Education*, *6*, 143-160.

Muhsin, M. R., Indartono, S., & Astuti, S. I. (2020, March). The role of school culture in teacher professionalism improvement. In *International Conference on Progressive Education (ICOPE 2019)* (pp. 158-162). Atlantis Press.

Naimanova, D., Lebedeva, L., Akpayeva, A., Astambayeva, Z., Ryabova, E., & Yessenova, K. (2023). Investigation of primary school teachers' student-centered teaching and technology integration competencies. *International Journal of Education in Mathematics, Science and Technology*, *11*(6), 1386-1404.

Nduku, E. (2019). The concept of positive school climate and its application to teaching and learning in secondary schools in Kenya. *International Journal of Educational Theory and Practice*, *2*(3), 48-66.

Newman, K., & Gentile, E. (2020). How teachers teach: Comparing classroom pedagogical practices in the Asia and Pacific Region.

Odell, M. R., Kennedy, T. J., & Stocks, E. (2019). The impact of PBL as a STEM school reform model. *Interdisciplinary Journal of Problem-Based Learning*, *13*(2).

Prifti, L., & Rapti, E. (2018). The relationship between attachment, stress and academic success in Albanian students. *Journal of Educational and Social Research*, *8*(2), 53.

Rahayu, S., Chandrasegaran, A. L., Treagust, D. F., Kita, M., & Ibnu, S. (2011). Understanding acid–base concepts: Evaluating the efficacy of a senior high school student-centred instructional program in Indonesia. *International Journal of Science and Mathematics Education*, *9*, 1439-1458.

Rauf, P. A., Ali, S. K. S., Aluwi, A., & Noor, N. A. M. (2018). The effect of school culture on the management of professional development in secondary schools in Malaysia. *MOJES: Malaysian Online Journal of Educational Sciences*, *2*(3), 41-52.

Rodríguez, R. G. (2010). Benefits of Parent and Community Engagement – A Community of Learners Approach Share: Facebook Twitter LinkedIn Print Email.• *IDRA Newsletter* • April 2010

Rugambwa, A., & Mwaikokesya, M. (2022). Effectiveness of School-based Professional Development in Addressing Teachers' Learning Needs and Improving Learner-centred Pedagogical Practices. *Rwandan Journal of Education*, *6*(2), 148-164.

Scott, C. L. (2015). Why Must Learning Content and Methods Change in the 21st Century. *Education research and foresight*.

Singh, A.K., Rind, I.A., Sabur, Z. (2021). Continuous Professional Development of School Teachers. In: Sarangapani, P.M., Pappu, R. (eds) Handbook of Education Systems in South Asia. Global Education Systems. Springer, Singapore. https://doi.org/10.1007/978-981-15-0032-9_31

Starkey, J. (2023). Effective strategies for building and sustaining a positive school culture and climate. Academy of Educational Leadership Journal, 27(S2), 1-3.

Tambunan, H., Silitonga, M., & Sinaga, N. (2023). Parents involvement in elementary schools learning through flipped classrooms in Indonesia. *Education 3-13*, *51*(6), 919-930.

Tang, A., Li, W., & Liu, D. (2021). The impact of teachers' professional development in science pedagogy on students' achievement: Evidence from TIMSS 2019. *International Journal of Science Education*, 43(14), 1648–1667.

Tang, A., Li, W., & Liu, D. (2022). The Impact of Teachers' Professional Development in Science Pedagogy on Students' Achievement: Evidence from TIMSS 2019. *Journal of Baltic Science Education*, *21*(2), 258-274.

Tang, K. H. D. (2023). Student-centered Approach in Teaching and Learning: What Does It Really Mean. *Acta Pedagogia Asiana*, *2*(2), 72-83.

Thenga, M., Goldschagg, P., Ferguson, R., & Mandikonza, C. (2020). Teacher professional development and Geography teachers' pedagogical practices for climate change education. *Southern African Journal of Environmental Education*, *36*.

Tucker, S. Y. (2014). Transforming pedagogies: Integrating 21st century skills and Web 2.0 technology. *Turkish Online Journal of Distance Education*, *15*(1), 166-173.

Tuomainen, S. (2023). Student-Centred Teaching to Support Learning. In *Supporting Students through High-Quality Teaching: Inspiring Practices for University Teachers* (pp. 59-76). Cham: Springer International Publishing.

Ucan, S. (2016). The role of continuous professional development of teachers in educational change: A literature review. *Harran Maarif Dergisi*, *1*(1), 36-43.

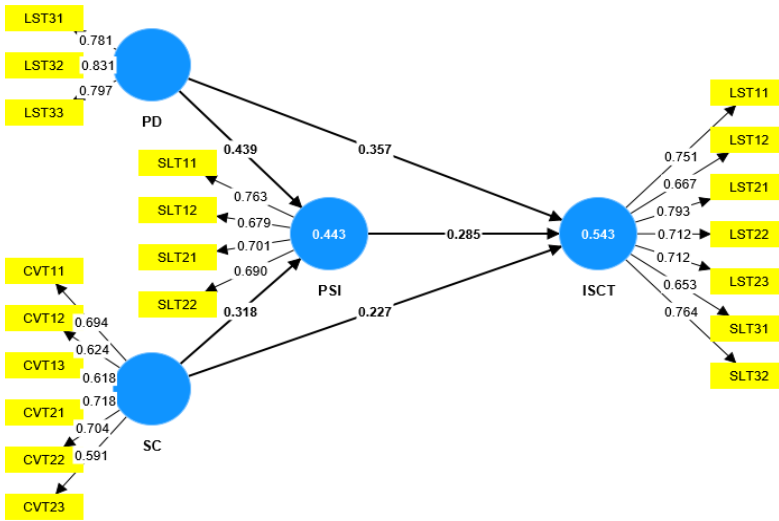
University of Central Asia (2021). *Education for the 21st Century in Kyrgyzstan: Current Realities and Roadmap for Systemic Reform* (ucentralasia.org). Retrieved from: https://ucentralasia.org/publications/2021/april/education-for-the-21st-century-in-kyrgyzstan-current-realities-and-roadmap-for-systemic-reform

Wood, L., Bauman, E., Rudo, Z., & Dimock, V. (2017). How family, school, and community engagement can improve student achievement and influence school reform: Literature review. *American Institute for Research (AIR), Washington, DC, SA*.

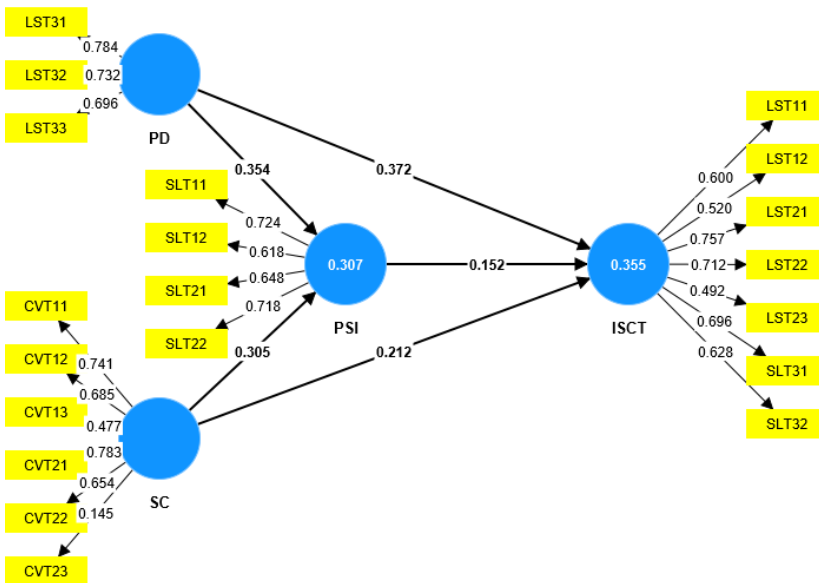
Zhang, L., Basham, J. D., Carter Jr, R. A., & Zhang, J. (2021). Exploring Factors associated with the implementation of student-centered instructional practices in US classrooms, *Teaching and Teacher Education*, *99*, 103273.

APPENDICES

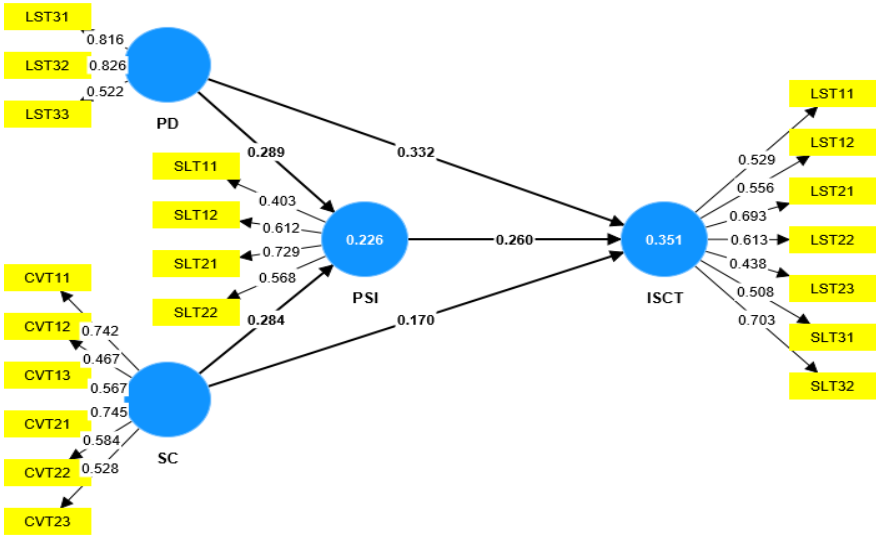
APPENDIX 1: OVERALL SAMPLE



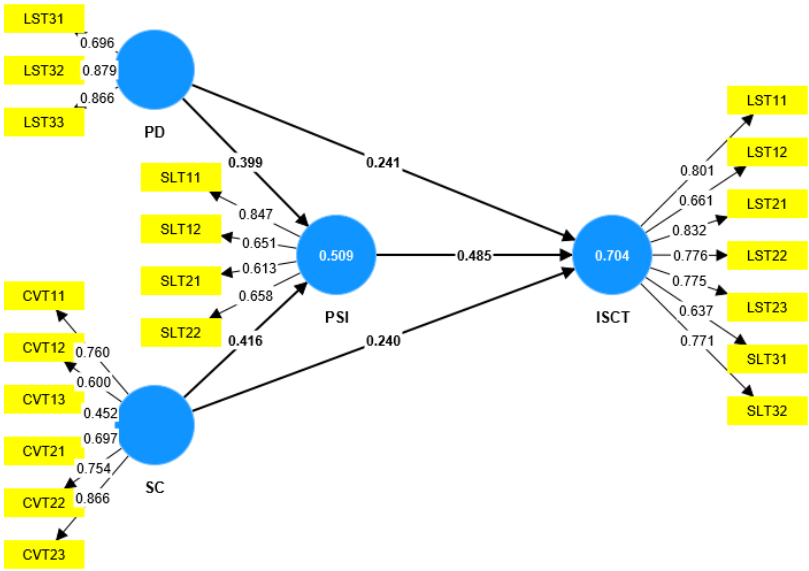
APPENDIX 2: INDONESIA



APPENDIX3: KYRGYZTAN



APPENDIX4: TANZANIA



Appendix 5: Item loadings, reliability and validity

	Indonesia					Kyrgyztan					Tanzania					Overall Sample				
	λ	Alpha	CR	AVE	VIF	λ	Alpha	CR	AVE	VIF	λ	Alpha	CR	AVE	VIF	λ	Alpha	CR	AVE	VIF
CVT11	0.741	0.65	0.767	0.384	1.412	0.742	0.357	0.672	0.348	1.307	0.760	0.79	0.848	0.491	1.607	0.694	0.739	0.821	0.435	1.406
CVT12	0.685				1.291	0.467				1.191	0.600				1.366	0.624				1.279
CVT13	0.477				1.198	0.567				1.165	0.452				1.202	0.618				1.284
CVT21	0.783				1.674	0.745				1.319	0.697				1.545	0.718				1.467
CVT22	0.654				1.387	0.584				1.361	0.754				1.597	0.704				1.438
CVT23	0.145				1.102	0.528				1.276	0.866				2.245	0.591				1.257
LST11	0.6	0.754	0.823	0.404	1.309	0.529	0.674	0.78	0.342	1.187	0.801	0.871	0.901	0.568	2.135	0.751	0.847	0.884	0.523	1.706

LST12	0.52				1.337	0.556				1.153	0.661				1.472	0.667				1.483
LST21	0.757				1.670	0.693				1.300	0.832				2.565	0.793				1.900
LST22	0.712				1.361	0.613				1.309	0.776				1.982	0.712				1.575
LST23	0.492				1.227	0.438				1.164	0.775				2.163	0.712				1.620
SLT31	0.696				1.523	0.508				1.313	0.637				1.280	0.653				1.407
SLT32	0.628				1.445	0.703				1.279	0.771				1.940	0.764				1.517
LST31	0.784	0.581	0.782	0.545	1.230	0.816	0.577	0.773	0.541	1.081	0.696	0.752	0.857	0.669	1.807	0.781	0.725	0.845	0.645	1.382
LST32	0.732				1.200	0.826				1.022	0.879				1.583	0.831				1.377
LST33	0.696				1.138	0.522				1.078	0.866				1.193	0.797				1.265
SLT11	0.724	0.611	0.773	0.46	1.493	0.403	0.357	0.672	0.348	1.098	0.847	0.642	0.789	0.487	1.244	0.763	0.669	0.801	0.502	1.292
SLT12	0.618				1.373	0.612				1.057	0.651				1.214	0.679				1.243
SLT21	0.648				1.370	0.729				1.237	0.613				1.402	0.701				1.422

SLT22	0.718			1.277	0.568			1.379	0.658			2.130	0.690			1.790

Appendix 6: Discriminant validity – cross loadings

	Indonesia				Kyrgyzstan				Tanzania				Overall Sample			
	SC	PD	PSI	ISCT	SC	PD	PSI	ISCT	SC	PD	PSI	ISCT	SC	PD	PSI	ISCT
CVT11	0.285	0.207	0.363	0.741	0.288	0.264	0.388	0.742	0.542	0.413	0.454	0.760	0.393	0.304	0.370	0.694
CVT12	0.282	0.294	0.369	0.685	0.082	0.190	0.184	0.467	0.329	0.321	0.407	0.600	0.317	0.345	0.377	0.624
CVT13	0.104	0.280	0.256	0.477	0.243	0.110	0.225	0.567	0.141	0.354	0.132	0.452	0.307	0.434	0.389	0.618
CVT21	0.421	0.381	0.289	0.783	0.406	0.372	0.259	0.745	0.483	0.366	0.448	0.697	0.484	0.401	0.360	0.718
CVT22	0.309	0.274	0.238	0.654	0.151	0.181	0.100	0.584	0.538	0.410	0.476	0.754	0.442	0.361	0.326	0.704
CVT23	0.053	-0.094	0.081	0.145	0.071	0.197	0.154	0.528	0.603	0.418	0.570	0.866	0.309	0.266	0.377	0.591
LST11	0.600	0.282	0.253	0.154	0.529	0.227	0.181	0.255	0.801	0.511	0.625	0.543	0.751	0.458	0.468	0.428
LST12	0.520	0.236	0.188	0.136	0.556	0.337	0.331	0.160	0.661	0.493	0.468	0.398	0.667	0.449	0.398	0.336
LST21	0.757	0.380	0.342	0.330	0.693	0.454	0.347	0.287	0.832	0.545	0.648	0.592	0.793	0.528	0.516	0.476
LST22	0.712	0.424	0.381	0.418	0.613	0.342	0.093	0.135	0.776	0.530	0.651	0.516	0.712	0.495	0.452	0.404
LST23	0.492	0.347	0.079	0.154	0.438	0.250	0.250	0.136	0.775	0.466	0.558	0.544	0.712	0.483	0.412	0.407
SLT31	0.696	0.343	0.314	0.388	0.508	0.133	0.207	0.289	0.637	0.475	0.581	0.458	0.653	0.409	0.435	0.437
SLT32	0.628	0.325	0.222	0.186	0.703	0.221	0.364	0.325	0.771	0.507	0.588	0.473	0.764	0.473	0.487	0.414

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LST31	0.457	0.784	0.349	0.264	0.439	0.816	0.266	0.282	0.466	0.696	0.373	0.417	0.514	0.781	0.430	0.408
LST32	0.355	0.732	0.364	0.419	0.411	0.826	0.376	0.306	0.586	0.879	0.520	0.422	0.542	0.831	0.509	0.462
LST33	0.360	0.696	0.351	0.233	0.204	0.522	0.213	0.240	0.582	0.866	0.602	0.468	0.515	0.797	0.524	0.414
SLT11	0.293	0.273	0.724	0.338	0.256	0.112	0.403	0.191	0.696	0.460	0.847	0.610	0.514	0.408	0.763	0.462
SLT12	0.278	0.287	0.618	0.282	0.292	0.181	0.612	0.212	0.479	0.467	0.651	0.454	0.405	0.417	0.679	0.387
SLT21	0.239	0.225	0.648	0.297	0.324	0.374	0.729	0.238	0.466	0.388	0.613	0.275	0.420	0.437	0.701	0.344
SLT22	0.332	0.469	0.718	0.308	0.204	0.209	0.568	0.290	0.522	0.422	0.658	0.353	0.434	0.469	0.690	0.367

SC = School Climate & Culture; PD = Professional Development; PSI = Collaborative Planning and Community Engagement ; ISCT = Innovative Student-Centered Teaching