# Teaching the Teachers: Technological Proficiency and Professional Growth in Rural Education

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## Abstracts

Preparing teachers in small rural schools to effectively integrate technology into their teaching practices is vital for fostering 21st-century skills in students, despite the unique challenges these settings present. To explore the specific challenges and opportunities related to the professional development of teachers in small rural schools, in the context of increasing digitalisation of education. This study employs a systematic review as its research method, aiming to identify, critically evaluate, and synthesize relevant studies that shed light on this context. Teacher education programmes that adeptly incorporate technology, such as mobile devices, into their curricula offer a critical support system not just for urban educators, but importantly for rural teacher candidates who may have limited access to higher education resources. Smartphones and tablets, for instance, can serve as valuable tools for these teachers, allowing them constant and remote access to professional development materials and effective learning resources. The technology also presents an opportunity for iterative learning, where immediate feedback can guide improvements in teaching strategies. Examples include the use of virtual avatars as teaching aids instead of in-person instruction. As the push for digitalisation continues, it is incumbent upon educational institutions to articulate the benefits and returns of such investments, especially in the context of small rural schools where resources may be limited and the challenges distinct. This articulation must be framed in terms that resonate with educators, students, communities, and potential educational funders in these rural contexts.

**Keywords**: teacher professional development, small rural schools, digital learning, digitalisation of education, teaching, information and communication technologies in education.

## Introduction

Empowering teachers in small rural schools to integrate technology into their teaching and collaborative processes is essential for preparing students for college and 21st-century careers. However, to achieve this effectively, teachers require specific preparation to design and implement a digital curriculum, necessitating targeted professional development. In developing technology-focused professional education programmes for teachers in rural settings, school districts and educational institutions should establish a well-defined set of expectations and intended outcomes, subsequently designing their programmes to meet these specific objectives [1]. This approach helps optimize the use of teachers' time and fosters meaningful professional growth.

In collaboration with partner school districts, educational institutions may categorize professional development into three distinct components: experience, training, and further education. Employing this conceptual framework, district staff, alongside education specialists, can craft individualized plans to help teachers in small rural schools adeptly incorporate technology into their teaching practices and, in turn, enhance student achievement [2].

Understanding these three broad categories of professional development can guide school districts in striking the appropriate balance to meet their unique needs and desired outcomes, particularly in the context of small rural schools. The first category, experience, may encompass attending conferences, engaging with guest speakers, participating in team-building activities, studying pertinent literature, enrolling in university courses, or partaking in summer institutes. These experiences aim to furnish teachers with valuable context and background, though not necessarily to directly alter teaching practices or influence student learning [3]. They are designed to prompt reflection on teachers' practices as they explore new ideas and resources, encouraging them to identify novel focuses and ways to augment their existing and future practices [4].

The training component, on the other hand, is crafted to bring about changes in teachers' practices. However, it often does not include explicit reference or assessment of student learning outcomes. Training may be administered through practicums, seminars, courses, independent learning modules, facilitated modules, in-person instruction, or virtual environments. Importantly, this learning is chiefly connected to the teachers' practices, as the training often lacks an embedded mechanism to directly influence student outcomes. Typically, these training programs are structured around a predefined curriculum that encourages the adoption of specific tools or strategies, without necessarily considering data before, during, or after the training event [5].

In the context of small rural schools, where teachers may face unique challenges such as limited resources and isolation, this framework offers a flexible and focused approach to professional development that acknowledges and aims to address the specific needs of these educators.

Professional development represents a complex, yet critical, form of professional learning for educators. Its objectives are dual in nature: to transform the way teachers approach their work and to enhance student learning outcomes. This may involve the formation of professional learning communities, the implementation of school-wide teaching or learning initiatives,

engagement with case studies, enrollment in university courses, participation in summer institutes, or involvement in task forces focused on specific subjects. The methodology underpinning professional development is grounded in research and is integrated as a central component of the broader educational programme. When thoughtfully designed, enduring structures for professional learning embed both experience and continued education as essential elements of professional development. This approach mandates meticulous planning and the establishment of unambiguous expectations to secure a positive and impactful outcome [6].

As education systems ardently work to tailor their approaches to the diverse needs of individual students, with the aim of effectively preparing them for college and subsequent careers, the paramount importance of comprehensive teacher training is increasingly recognized. While this encompasses ongoing professional learning opportunities for in-service teachers, districts and schools also routinely welcome a new cohort of educators each year, emerging from both traditional and alternative teacher education and training programmes [7].

In parallel with efforts by districts to institute and uphold elevated standards for students, and to optimally leverage the potential of digital learning tools, teacher education programmes must themselves evolve. It is imperative that they are designed to ensure that prospective teachers acquire an in-depth understanding of both teaching methodologies and curriculum design. This is essential in enabling them to personalize learning experiences for their students, adeptly utilize data to inform instruction, and effectively integrate digital learning technologies as a fundamental aspect of their teaching strategies [8].

Purpose of the study: To critically examine the scientific and methodological foundations necessary for the revitalization and updating of the teacher professional development system, specifically in the context of the increasing digitalization of education and the unique challenges faced by teachers in small rural schools. This study aims to contribute insights and recommendations that can help to shape robust, context-sensitive professional development programmes that equip teachers in these settings with the skills and knowledge needed to effectively leverage digital tools and resources in their teaching practice, thereby promoting enhanced learning outcomes for their students.

## Materials and Methods

The research methodology employed in this study was designed to explore and identify the scientific and methodological foundations necessary for the renewal of the professional development system for teachers, with a particular focus on the digitalisation of education in the context of small rural schools. A systematic review was used as the primary research method, which involves a structured and rigorous process for identifying, critically evaluating, and synthesizing relevant studies. The objective of this systematic review was to locate all empirical data that satisfies predetermined inclusion criteria, which are designed to address a specific research question or hypothesis. By adopting clear and systematic methods in the examination of articles and all accessible evidence, biases can be minimized, thereby ensuring the reliability of the results upon which conclusions and decisions are based.

In addition to the systematic review, a meta-analysis was conducted as a key component of the research methodology. Meta-analysis is a statistical technique used to combine the results of various individual studies for the purposes of weighting and comparison. This approach enables the identification of patterns, disagreements, or relationships that emerge across multiple studies investigating the same subject. In the meta-analytic process, each primary study is abstracted and coded, and the results are subsequently converted into a common metric to compute the overall effect size or value. However, conducting a meta-analysis requires that the included studies report general statistical measures (effect sizes) that facilitate the comparison of results. Consequently, conducting a meta-analysis of studies that employ divergent methodological approaches can be challenging, as this may complicate the harmonization of effect sizes for comparative analysis.

In the context of this study, this combined approach of a systematic review and meta-analysis is aimed at rigorously examining the existing body of literature related to the professional development of teachers in small rural schools amidst the increasing digitalisation of education. This methodological strategy is designed to yield insights that are both deep and broad, and which are capable of informing evidence-based recommendations for the renewal and enhancement of teacher professional development systems in these unique educational settings.

After conducting a literature review and selecting a final sample of studies, it is imperative to determine how the research will be used for the relevant analysis. Thus, upon identifying the final sample, standardized methods for extracting pertinent information from each item must be established. Extracted data may include descriptive information, such as authors, years of publication, subject or type of study, or it may pertain to specific effects and results of each study. Additionally, the extracted data may involve the conceptualization of a specific idea or theoretical stance.

It is crucial that this data extraction process aligns with the purpose and research question of the particular review, and thus the form of the extracted data can vary. At this stage, it is essential to consider the training of reviewers to ensure consistency in coding and abstraction, especially if the review process involves more than one reviewer. Close monitoring of data abstraction during the review process is necessary to uphold the quality and reliability of the extracted information.

In cases where the intention is to publish the review in an academic journal, this often necessitates a detailed description of the data extraction process as well as an assessment of reliability between reviewers. While this may be relatively straightforward when the data of interest are quantitative in nature, such as general population characteristics, effect sizes, or sample sizes, it can become notably more complex when the review focuses on qualitative aspects of the literature, such as differing perspectives or the historical chronology of research on a topic.

For example, when examining the subjects of literature, perspectives, or historical chronology, the extraction process may involve interpreting and coding nuanced narratives, theoretical arguments, or context-specific findings. This can introduce an additional layer of complexity, as it requires reviewers to navigate and reconcile subjective or interpretive elements within the literature. In these situations, it is vital to develop clearly defined coding categories or themes,

establish rigorous protocols for resolving discrepancies between reviewers, and perhaps involve a third reviewer or arbiter to mediate disagreements.

Ensuring that the data extraction process is systematic, transparent, and replicable is fundamental to the integrity of a systematic review. This involves clear protocols, training for reviewers, regular checks for consistency, and a thorough and transparent reporting of the methods used, all of which are essential for ensuring the quality, reliability, and credibility of the review findings.

## Results and Discussion

The rapid advancement of technology, particularly wireless digital technology and high-speed internet connections, is transforming communication and educational practices, a transformation that is deeply felt in small rural schools. Plans to expand high-speed internet access are increasingly viewed as essential for all regions, including rural areas. The expectations, as well as the learning and thinking styles of students who are familiar with these technologies, are pressuring educators, including those in rural settings, to adapt their teaching practices. Research within the field of teacher education, with a focus on the unique needs and contexts of small rural schools, indicates that future teachers are seeking more flexible delivery of course materials and a greater integration of new digital mobile technologies into their instructional practices [9].

In light of these trends, projections suggest that market forces and policy developments will significantly shape the educational landscape in rural areas. The emergence of public-private partnerships is anticipated, which may develop alongside privatized educational institutions possessing global accreditation. This could result in governance structures at an international level, with professional bodies granting accreditation to educational institutions, a model that could be increasingly relevant for rural educational settings striving to meet global standards.

Moreover, major multinational publishers are expected to provide online educational content directly tied to the delivery of accredited courses—a system akin to an online repository of institution-accredited learning materials that teachers and students in rural schools can access and download onto personal devices, anywhere and anytime. In such a future scenario, educational voucher systems may emerge, enabling individuals to redeem their vouchers at the educational institution of their choice, thus promoting a market-based model of user choice that could significantly impact the traditional educational sector, including in rural communities [10].

With the integration of digital technology and high-speed broadband, unimpeded access to courses from anywhere in the world becomes a reality. For small rural schools, this connectivity can potentially address issues of educational equity, offering teachers and students in remote areas unprecedented access to resources and learning opportunities. Courses could be marketed internationally, compelling educational institutions, including those serving rural populations, to develop specialized niche markets and unique strengths in order to maintain their relevance and market share in this evolving landscape [11].

In this context, the professional education of teachers in small rural schools faces the critical challenge of preparing educators not only to navigate this swiftly changing environment but also

to leverage these tools and trends effectively and equitably for the benefit of their students, their schools, and their broader communities.

In the context of professional education of teachers in small rural schools and the challenges they face, public-private partnerships are poised to play a critical role in providing practical teaching experiences and supervision. Leveraging advancements in technology, student teachers in rural settings might utilize digital video technology to record their teaching practices via mobile phones or other portable devices. With the anticipated availability of high-speed broadband access across regions, such as in the Republic of Kazakhstan [12], these student teachers could use cloud portals to upload high-resolution videos of their teaching sessions, allowing for detailed analysis and reflection on their practice.

This technology facilitates a new dimension of mentorship and professional development: the recorded video analysis would be immediately available online for experienced teachers or supervisors to review, comment on, and provide targeted feedback. Educational materials, including all texts, would transition to electronic publication formats. These digital formats, readable on mobile devices, could feature embedded videos and hyperlinked components to vividly illustrate teaching methods and strategies, thereby enriching the pre-service teachers' learning experience.

In this evolving educational landscape, lecturers and mentors could leverage videoconferencing technology to establish real-time, engaging digital learning communities, reducing or even eliminating the need for face-to-face classes on campus—a significant benefit for teacher candidates in remote rural areas. All training sessions could be digitally recorded and stored online, making them accessible for students in various time zones and locales.

To actively engage students in this virtual learning environment, training could incorporate interactive audience response devices, such as "clickers," or mobile phones. These technologies, by recording students' responses and summarizing them through an online survey, allow students to receive immediate feedback and compare their performance with that of their peers. Such tools foster an active and participatory virtual community among students who may be geographically dispersed.

In this envisioned model, teacher education programs would shift towards a results-based approach, wherein students' progress is measured by teaching experience and completed coursework, allowing for a flexible timeframe tailored to each student's level of experience and prior learning. This contrasts with traditional models that often focus on inputs, such as the number of years spent as a full-time student.

As career trajectories become increasingly fluid and responsive to societal demands, an expansion of postgraduate programs at the master's level is anticipated. Teachers, in this context, would be expected to exhibit flexibility in their instructional methods—for example, conducting real-time online classes through voice-over-internet protocols. Educational resources, including lesson materials and recorded lectures, would be uploaded to cloud storage repositories, ensuring swift and convenient access for both teachers and students, regardless of location. Streaming video and enhanced podcasts could connect student teachers with their peers and mentors, not

only in learning centers across regions like Australia but also internationally, in students' homes via the internet, or at their workplaces through mobile devices.

This model represents a comprehensive integration of technology into teacher education, particularly significant for small rural schools where geographic isolation presents a unique set of challenges and opportunities.

In the evolving landscape of professional education for teachers in small rural schools, virtual portals and augmented reality simulations, such as those found in platforms like Second Life, hold significant promise. Within such virtual environments, student teachers can engage in practical teaching practice. Through the use of avatars—virtual characters representing the students—future educators can simulate real-world teaching scenarios in a risk-free, digital space. Such online platforms could serve as venues for classes, lectures, and broader learning communities.

These virtual spaces can be developed through private ownership or public-private partnerships, dramatically reducing the need for extensive physical infrastructure, thereby cutting costs significantly. For example, in a model akin to the Charter School movement in the United States, main campus buildings could be managed by professional companies for maximal efficiency, minimizing non-productive use of space and thereby conserving resources.

Education in this model could increasingly adopt blended formats, integrating on-the-job training, online coursework, and, when necessary, intensive face-to-face training sessions. Importantly, a global accreditation system could empower students with the flexibility to select courses that align with their learning needs from a variety of institutions, rather than being tied to a single university or college. This would likely encourage the development of more cross-institutional partnerships, fostering collaborative course offerings and shared educational resources and teaching experiences [13].

However, this model is not without its potential drawbacks. In multicultural nations, such as the Republic of Kazakhstan, a digitized, globally-oriented education system may risk marginalizing certain cultural groups, including indigenous populations. Ensuring that course content remains culturally sensitive and locally relevant would be paramount. Adapting content to reflect the values, histories, and needs of diverse student populations and their communities would be essential to avoid the inadvertent imposition of dominant cultural narratives.

For individuals considering a career in education, particularly amidst a climate often marked by critical news coverage and political statements regarding teachers and the education system, efforts must be made to counter this narrative with credible, positive information. Prospective teachers should be encouraged—and given the opportunity—to explore the profession firsthand. This could include spending time in schools, informal learning spaces, or participating in job-shadowing opportunities with experienced teachers. Structured reflection activities, such as journaling or seminars like "Do You Think You Want to Be a Teacher?", can offer prospective educators a space to consider their fit for the profession critically.

For career switchers—those transitioning to teaching from other professions—specialized programs could facilitate their entry into the field. Drawing inspiration from initiatives like the

"Career Switcher" program in some regions, these individuals, often possessing degrees and professional experience in their field, could undertake targeted coursework while benefiting from a robust, supportive teaching internship [14].

As the professional education of teachers continues to evolve, particularly for those in small rural schools, striking the balance between leveraging innovative digital tools and maintaining a culturally-sensitive, locally-grounded, and personally-nurturing educational experience will be a critical challenge to address.

In regions where staff access is a challenge, such as rural or remote areas, these programs prove especially effective. The author, having worked with a program of this nature, observed that many participants, despite having successful previous careers, felt a deep-seated desire to give back to their communities and sought teaching as a means to do so.

As the author contends, we are swiftly moving toward an era where terms like 'digital' and 'technology' are inherently understood to be integral components of quality education, rather than separate entities. Nonetheless, a gap remains between this vision and current practice. The author emphasizes that, irrespective of the specific tools and processes desired for classroom integration, the foremost priority of any teacher training program should be to cultivate an environment where their trainees—both current students and graduates—are themselves learning through the use of these tools and resources [15].

This philosophy resonates with a widely recognized tenet of education: teachers tend to instruct in the manner in which they were taught. This may refer to experiences in primary or secondary school, or during pre-service teacher training programs. The author cites the case methodology—a pedagogical approach they first encountered in graduate school—as a transformative learning context that they could not have envisioned implementing without firsthand experience.

Similarly, for technology, the author posits that if a teacher, in their own educational journey, has leveraged computational tools to explore scientific concepts, such as Newton's Second Law of Motion, they are more inclined to integrate these tools in their own teaching, whether instructing physics at the secondary level or introducing foundational concepts to primary students. The author argues strongly for teacher education programs to be pioneers in offering such enriched, hands-on learning environments to their trainees [16].

In the context presented, there are 188 teacher training institutions in the nation, encompassing a variety of public and private entities—from initial training institutes to higher-level teacher training colleges. The Information and Communication Technology Policy underpins the imperative for ubiquitous integration of ICT training across these institutions, positioning it as a foundational component for preparing a competent workforce in this domain.

The government, recognizing the potential of this approach, has articulated plans to foster ICT education at secondary levels. Notably, mobile technology, though currently underutilized, has been identified as a promising avenue for training remote school teachers through mobile learning platforms. This strategy could serve as an efficient mechanism for enhancing teaching practice, particularly for educators in rural or remote areas, including those serving vulnerable

or female populations. Beyond direct pedagogical benefits, educational administrators, too, may find valuable applications for mobile learning in their work [17].

In summary, as digital and technological tools become increasingly ingrained in educational contexts, the author urges teacher training programs to lead by example, immersing their trainees in technology-rich environments that mirror the future classrooms these educators will, in turn, shape and inspire.

This detailed exposition captures several critical aspects of technology integration in modern education, highlighting the importance of teacher competence in Information and Communication Technology (ICT). Let's break down the key points and implications for teacher training programs, schools, and policy-makers:

Teacher Competence and Confidence in ICT:

- For teachers to effectively incorporate technology into their teaching practices, they must possess a robust set of computer skills. This includes proficiency in word processing, presentation software, spreadsheets, and often extends to various educational platforms and tools.

- Teachers' ICT competence and confidence are critical determinants of how extensively and effectively they will integrate technology into their teaching. The quality and quantity of teacher training programs in ICT directly affect this competence and confidence [18].

Impact of Teacher Training Programs:

- Educational technologists, individuals specializing in the integration of technology within teaching and learning environments, need not only to have effective communication skills but also expertise in curriculum development to ensure the technology is effectively and appropriately integrated into the teaching and learning processes.

- Teacher training programs should thus focus on equipping teachers with both the technical skills and the pedagogical knowledge necessary to integrate technology effectively into their classrooms.

Addressing the Experience Gap:

- Many experienced teachers started their careers in an era where technology was not a significant component of education. Continuous professional development opportunities are vital to ensure that these teachers can acquire and maintain the technological competence necessary for modern education [19].

- When given opportunities to learn new technological skills, many teachers embrace these opportunities and consequently improve their competence.

Barriers to Computer-Assisted Learning:

- Teachers' lack of computer skills can make them feel uncomfortable in front of their classes and increase the time needed to prepare teaching materials. Thus, computer-assisted teaching,

while potentially powerful, does demand a different and sometimes greater effort from teachers, at least initially [20].

Variables Influencing ICT Skills:

- The research data suggests that computer literacy among teachers varies and can be influenced by several factors, including gender, experience, and education level. Most teachers in the study exhibited an intermediate level of computer literacy, and their confidence in using computers ranged from moderate to high [21].

Pre-Service Teacher Training:

- Future teachers, those currently in pre-service teacher training programs, are a critical group. The data suggests that they generally perceive themselves to have an average level of competence in using technology.

- This highlights the importance of robust ICT training components within pre-service teacher education programs, to ensure that new teachers are entering the profession with the skills necessary for modern classrooms.

In light of these insights, it is evident that for technology integration in education to be successful and widespread, significant emphasis must be placed on comprehensive and ongoing teacher training in ICT. This training should be viewed not merely as a box to be checked but as a foundational component of modern teacher preparation and professional development. Governments, educational institutions, and policy-makers must consider this as they design and implement educational policies and programs.

To evaluate computer literacy among teachers in small rural schools, several influencing factors are identified, including gender, age, and administrative roles within the school. The examination of teacher learning indicates variability related to gender, experience, and educational background. A study was conducted to assess the computer skills of male and female teachers. Before participating in the training, both genders rated their computer skills similarly at an average level. Remarkably, by the conclusion of the training, women's self-assessment of their computer skills had substantially improved, surpassing the self-assessments of their male counterparts.

Age emerged as a significant factor in computer technology engagement among teachers. Younger teachers predominantly associated information literacy with information and communication technology, while teachers in older age groups held differing views. Notably, most participants in this study were relatively new to the teaching profession, with less than 10 years of experience, and they closely linked information literacy with ICT.

The teachers cited various barriers to explicitly teaching information literacy skills, a prominent one being time constraints. Interestingly, the study found that male teachers demonstrated a higher level of computer literacy than their female counterparts [22].

In the broader context of teacher education, particularly for small rural schools, substantial challenges are emerging. The university at which the author is employed serves as a significant

provider of higher education for future teachers in the state and is among the largest in Australia. Over the past nine years, this institution has experienced a noticeable decline in enrollment in teacher education programs. This downturn has triggered severe consequences, including substantial cuts in public funding allocated for teacher preparation programs.

As a result, teacher training institutions, including this university, have faced a widespread reduction in experienced staff members. This downsizing has led to increased workloads for remaining faculty, larger class sizes, and lower academic preparedness levels among incoming students. Critically, funding cuts have stifled the adoption of innovative teaching strategies. For example, the integration of new technologies into teacher training programs — a practice that is crucial for preparing teachers for the digital age — has been curtailed.

In this challenging environment, teacher educators are caught in a paradox. They are expected to produce high-quality graduates equipped for the 'digital education revolution,' as governmental policies advocate. However, they are compelled to meet these expectations without corresponding increases in funding or resources to facilitate high-level, technologically rich instruction [23].

While the Kazakhstani government allocates significant funding for the installation of computers in school classrooms, particularly in rural areas, the critical need lies in training teachers to effectively utilize these technological resources. To enable a "digital education revolution," concerted efforts must begin with substantial investment in the professional education of future teachers. By dedicating resources to teacher education, the government would be making an investment in the nation's future, laying the groundwork for a comprehensive and world-class education system.

Demographic projections for Kazakhstan indicate an aging workforce by 2030, with estimates suggesting that the economically inactive segment of the population could rise to between 35 and 42 percent. This demographic shift portends a need for a potential recalibration of public expenditure. A large and growing voting bloc over the age of 65 may significantly influence the allocation of tax funding, potentially directing priorities toward healthcare and pensions, and thereby necessitating reductions in other sectors, including higher education [24].

In the context of constrained public expenditure, one proposed strategy is the advancement of a more stratified higher education system. Under this model, costly research activities would be concentrated within a select few universities, thereby potentially relegating other institutions, including those specializing in teacher education, to a lower status akin to teacher training colleges. This restructuring could have been anticipated by the government's introduction of a research quality framework in 2007. Although this framework was later dissolved, the implications of any similar future system remain uncertain.

For institutions that play a vital role in preparing teachers for small rural schools, this stratification could represent a profound downgrade in status and function. While such reorganization might present short-term fiscal savings for the government, it raises serious concerns about a long-term decline in the quality of teacher education, particularly in rural areas where the need for highly qualified teachers is acute. This model may also hinder Kazakhstan's ability to attract international students and may further disincentivize scholars due to the lack of

research funding, thereby potentially compelling them to seek opportunities abroad or in other sectors, contributing to a significant drain of intellectual and educational capital [25].

In a public-private partnership (PPP) model, the government collaborates effectively with private service providers. This approach, mirroring the "3rd way" public-private partnership endorsed by the Liberal Democrat ideology in the UK and akin to the charter school movement in the United States, offers a unique intersection of public funding and private operational efficiency. Charter schools, as an example, are publicly funded institutions managed by private entities aimed at achieving enhanced operational efficiency.

Researchers highlight the merits of such systems, where academic professionals can focus intensively on teaching and research, while administrative functions are adeptly handled by outsourced private providers. In the context of education, especially in small rural schools, this may manifest as partnerships between educational institutions and private companies for work-based learning and hands-on training experiences for teachers.

One proposed financing model for bolstering higher education, including teacher education programs, is the voucher system. Under this framework, the costs of higher education would be calculated on a per-student basis, with funds allocated directly to students in the form of vouchers. Market forces would thus play a role in shaping the size of courses and institutions. Ideally, from a perspective aligned with social equity values, such as those of the Labour Party, these vouchers would be fully funded by the state, fostering a well-trained workforce poised to stimulate economic growth.

This model could further be supported by low-interest loans for students pursuing postgraduate studies, and may lead to the proliferation of online courses designed to cater to individuals with full-time employment or family responsibilities [26].

Professional teacher training services, as essential in this context, encompass a diverse array of courses grounded in experience, learning theory, and professional development, and are tailored to assist districts in seamlessly integrating technology into daily teaching practices. One such exemplar approach, as demonstrated in Dell's four-step methodology for professional learning programmes, includes:

Assessment: Utilizing diagnostics, surveys, and other tools to establish a comprehensive needs assessment with clearly delineated outcomes.

Design: Based on the assessment, educational specialists collaborate with the district to craft a holistic strategy aimed at meeting its specific needs and achieving the desired outcomes. This strategy is founded on an optimal blend of experience, training, and professional development.

Implementation: Education specialists partner with the district to execute the plan, adhering to a timeline that is harmonized with other technology initiatives.

Evaluation: Throughout the program, continuous data collection and monitoring are conducted to ascertain that key milestones are met and intended goals are realized [27].

Recognizing that the transformation of teacher practice and enhancement of student learning is a process, rather than a singular event, it is imperative for school districts, especially those in

rural settings, to routinely revisit the assessment phase. This cyclical review process ensures the ongoing identification of new professional learning opportunities and the iterative refinement of educational strategies.

## Conclusions

Efficient integration of mobile technology into teacher education programmes emerges as a promising tool to support all teacher candidates, including those serving small rural schools and those engaging with higher education systems. Smartphones and tablets are increasingly ubiquitous and can offer teachers, at any stage of their career, timely and convenient access to resources that foster professional growth and streamlined learning. These devices are capable of delivering diverse and flexible learning experiences to teachers, who in turn can impart these practices to their students. Nevertheless, effective integration of this potent technology is not instantaneous—it requires thoughtful training and support from the onset of a teacher's educational pathway.

For contemporary educational practice, especially in relation to English language learners in rural settings, this technological integration is crucial. For instance, technology can facilitate repeatable learning experiences, providing immediate and actionable feedback that informs teachers' subsequent instructional strategies. It may include using interactive digital platforms for reliable feedback, vocabulary enhancement, and innovative teaching models such as avatar-led instruction.

In this context, higher education institutions are increasingly compelled to articulate the return on investment of their programmes, in terms that resonate with students, the public, and potential employers. This demand fuels a broader debate concerning the criteria for determining educational outcomes. One notable proposal, introduced by the federal government, would mandate that higher education institutions track their graduates' earnings, known as the "gainful employment" metric. While this measure may not imminently become a formal accountability requirement, it signals a growing valuation of outcome indicators and posits a case for higher education, particularly teacher education, to establish meaningful outcome metrics.

Considering the broader societal obligation to foster student-centric approaches and to ensure that all graduates, including those from rural areas, are adeptly prepared for their careers, the potential of teacher candidates must be optimally harnessed from the onset of their professional journeys. It is pivotal, albeit frequently overlooked in the current systems, that this preparation commences at the very inception of a teacher's career.

A word of caution merits mention: education, as the foundation upon which the future of society and our children is constructed, should not be reduced to a mere commodity, subject to the whims of market forces or accessible solely to affluent individuals. The quality of teaching, intrinsically tied to national culture and values, is too significant and strategic to be solely dictated by economic pressures.

The impetus thus lies in attracting and selecting exceptional applicants for teacher education, rigorously monitoring the quality of future educators, and staunchly safeguarding academic

integrity. Paramount is the provision of the highest calibre of education—a fundamental right of all students and a cornerstone for forging a resilient and prosperous society.

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## WORKS CITED

Tashkeyeva, G., Sadirbekova, D., Zulbukharova, E., Abykanova, B., Sariyeva, A. 2019. Practice-oriented education in universities: opportunities and challenges. 19th International Multidisciplinary Scientific GeoConference SGEM, 19(5.4), 245-250.

Abykanova, B., Bilyalova, Z., Makhatova, V., Idrissov, S., Nugumanova, S. 2016. Psychological and pedagogic conditions of activating creative activity in students for successful learning. International Journal of Environmental and Science Education, 11(10), 3333–3343.

De Loof, H., Struyf, A., Boeve-de Pauw, J., Van Petegem, P. 2019 Teachers' motivating style and students' motivation and engagement in stem: The relationship between three key educational concepts. Research in Science Education. https://link.springer.com/article/10.1007%2Fs11165-019-9830-3

Fankhauser, S.C., Reid, G., Mirzoyan, G. 2021. Participating in the scientific publication process: Exploring how pre-college students perceive publication within the scientific enterprise. Disciplinary and Interdisciplinary Science Education Research, 3, article number 4.

Breslin, G., Shannon, S., Rafferty, R., Fitzpatrick, B., Belton, S., O'Brien, W. 2019. The effect of sport for LIFE: all island in children from low socio-economic status: a clustered randomized controlled trial. Health Qual Life Outcomes, 17(1), article number 66.

Tashkeyeva, G., Abykanova, B., Sariyeva, A., Sadirbekova, D., Marhabaeva, A. 2016. Application of methods of interactive training in the educational environment of higher educational institutions. International Multidisciplinary Scientific GeoConference Surveying Geology and Mining Ecology Management, SGEM, 3, 747–754

Rodriguez-Ayllon, M., Cadenas-Sanchez, C., Estevez-Lopez, F., Munoz, N.E., Mora-Gonzalez, J., Migueles, J.H. 2019. Role of physical activity and sedentary behavior in the mental health of preschoolers, children and adolescents: A systematic review and meta-analysis. Sports Medicine, 49, 1383-1410.

Lederman, J., Lederman, N., Bartels, S., Jimenez, J., Akubo, M., Aly, S., Zhou, Q. 2019. An international collaborative investigation of beginning seventh grade students' understandings of scientific inquiry: Establishing a baseline. Journal of Research in Science Teaching, 56(4), 486–515.

Faber, I.R., Koopmann, T., Büsch, D., Schorer, J. 2021. Developing a tool to assess technical skills in talented youth table tennis players – a multi-method approach combining professional and scientific literature and coaches' perspectives. Sports Medicine – Open, 7, article number 42.

Imashev, G., Kenzegulov, B.Z., Sardarova, Z.I., ... Nugumanova, S.B., Abykanova, B.T. (2016). Applied questions of electrodynamics in physics course 11(7), 2163–2177.

Berdyguzhin, L., Sarsenov, A., Tulenoba, U., Mirbolatov, S., Berdigozhina, M. 2017. The history of the oil industry in Kazakhstan: From the origins to the present day. Man in India, 2017, 97(2), 639–653.

Tashkeyeva, G., Abykanova, B., Idrissov, S. 2014. Intensification of students' creative activity in educational environment of higher educational institutions. Life Science Journal, 11(Special Issue), 133-137.

Alexander, P.A. 2020. Methodological guidance paper: The art and science of quality systematic reviews. Review of Educational Research, 90(1), 6–23.

Fletcher, T., Ni, C.D. 2021. Pedagogical principles that support the prioritisation of meaningful experiences in physical education: conceptual and practical considerations. Physical Education and Sport Pedagogy, 2021, 1–12.

McDavid, L., Carleton Parker, L., Li, W. 2020. The effect of an in-school versus after-school delivery on students' social and motivational outcomes in a technology-based physical activity program. International Journal of STEM Education, 7, article number 28.
Altunkurek, S.Z., Bebis, H. 2019. The effects of wellness coaching on the wellness and health behaviors of early adolescents. Public Health Nursing, 36(4), 488–97.
Harrington, D.M., Davies, M.J., Bodicoat, D.H., Charles, J.M., Chudasama, Y.V., Gorely, T. 2018. Effectiveness of the 'Girls Active' school-based physical activity programme: a cluster randomised controlled trial. International Journal of Behavioral Nutrition and Physical Activity, 15(1), article number 40.
Betancur, L., Votrub-Drzal, E., Schunn, C. 2018. Socioeconomic gaps in science achievement. International Journal of STEM Education, 5, article number 38.
Eckes, A., Großmann, N., Wilde, M. 2018. Studies on the effects of structure in the context of autonomy-supportive or controlling teacher behavior on students' intrinsic motivation. Learning and Individual Differences, 62, 69–78.
Zhou, L., Ntoumanis, N., Thogersen-Ntoumani, C. 2019. Effects of perceived autonomy support from social agents on motivation and engagement of Chinese primary school students: Psychological need satisfaction as mediator. Contemporary Educational Psychology, 58, 323–330.
Johnstone, K. M., Kemps, E., Chen, J. 2018. A meta-analysis of universal school-based prevention programs for anxiety and depression in children. Clinical Child and Family Psychology Review, 21(4), 466–81.
Schnell, S. 2018. Reproducible research in mathematical sciences requires changes in our peer review culture and modernization of our current publication approach. Bulletin of Mathematical Biology, 80(12), 3095–3105.
Salmi, H., Thuneberg, H. 2019. The role of self-determination in informal and formal science learning contexts. Learning Environments Research, 22(1), 43–63.
Luna, P., Guerrero, J., Cejudo, J. 2019. Improving adolescents' subjective well-being, trait emotional intelligence and social anxiety through a programme based on the sport education model. International Journal of Environmental Research and Public Health, 16(10), article number 23.
Halliwell, E., Jarman, H., Tylka, T.L., Slater, A. 2018. Evaluating the impact of a brief yoga intervention on preadolescents' body image and mood. Body Image, 27, 196–201.
Bremer, E., Graham, J.D., Veldhuizen, S., Cairney, J. 2018. A program evaluation of an in-school daily physical activity initiative for children and youth. BMC Public Health, 18(1), article number 1023.
Christiansen, L.B., Lund-Cramer, P., Brondeel, R., Smedegaard, S., Holt, A.D., Skovgaard, T. 2018. Improving children's physical self-perception through a school-based physical activity intervention: The move for well-being in school study. Mental Health and Physical Activity, 14, 31–8.