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TIL O'QITISH METODIKASI VA RAQAMLI PEDAGOGIKA

GOING DIGITAL IN TEACHER EDUCATION: TOOLS, PRACTICE, AND LINGERING BARRIERS

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ABSTRACT

This article investigates how teachers and students use digital technologies in the classroom, including which tools are most commonly used and what obstacles arise. We conducted a survey of 50 teachers and 150 students using two independent Google Forms surveys, and the results were relatively apparent. Learning management systems and online collaboration platforms proved to be the most popular technologies in both categories. One thing stuck out, however: students use these tools more than their teachers, nearly universally, and a tiny but not-insignificant number of teachers appear to be unaware of their existence. We interpreted these findings through two known lenses: constructivism and connectivism.

Keywords

Digital pedagogy, teacher education, learning management systems, collaborative learning, flexible learning, continuous professional development.

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Introduction

Simply described, digital pedagogy is the study and practice of teaching and learning with modern digital technology. However, it is not limited to online distribution; the same concepts apply to hybrid classrooms as well as traditional face-to-face classes. And the real question isn't how many devices are in the room, but what technology genuinely alters how kids interact.

Here's why this is important, especially for teacher training. Student instructors do not only study teaching approaches; they absorb them. So, if their instructors rely on shallow, check-the-box tools, such shallowness is likely to be passed down to subsequent generations of classrooms. The contrary is also true: when teachers use digital tools with a clear purpose, the habit spreads. This multiplier impact - one educator shaping many - is what makes teacher training institutions such valuable sites to study digital pedagogy in the first place.

With that in mind, the paper seeks to address a rather straightforward question. Policy documents and the broader literature are full of desire and enthusiasm, but we wanted to know what is actually occurring on the ground: which tools teacher educators and student teachers use, what they use them for, and, most importantly, where the gaps exist. To get there, we'll go over the conceptual and theoretical foundations of digital pedagogy, examine evidence from teacher education institutions, and then figure out what all of this implies for institutional practice.

Review of Related Literature

Recent literature insists that digital pedagogy is more than merely tool use. Rousseau (2012), for example, characterizes it as treating digital resources from a pedagogical perspective, implying that the when and

why of using a tool are considerably more important than the how. JISC (2020) defines digital pedagogy as the study of how digital technologies can be used most effectively in teaching and learning; the advantage of this phrasing is that it keeps technology, pedagogy, and student engagement in a fluid relationship rather than a fixed pecking order. Howell (2012) takes the idea a step further and focuses on the transformation itself: what happens to instructional practices when digital technology enters the classroom. When all three are considered together, a unifying thread emerges: digital pedagogy is primarily a design discipline rather than a technical skill set.

Everything is built on two learner-centered traditions. The first is constructivism, which asserts that knowledge is created rather than merely transferred. Digital environments expand the range of materials that learners can construct with - interactive content, simulations, shared artifacts, peer collaboration - and each of these contributes to the active construction of understanding, nudging students toward critical thinking and problem solving rather than simply soaking things up.

The second concept is connectivism. Siemens (2004, 2005) introduced it, and its main premise is to locate learning in networks: knowing anything requires being connected to the relevant sources and groups, and learning occurs as information travels across those digital connections. This corresponds to what you can really see happening in teacher education. Learning management systems, online forums, and social platforms enable students to connect with peers, educators, and subject matter experts far beyond the confines of their institution. And when knowledge is co-created and bounced against a variety of views in this way, you get exactly the kind of deepening that constructivism predicted collaboration would bring - therefore the two theories ultimately support each other.

When it comes to results, the literature divides the gains into three categories. The first step is to assess. Digital formative assessment platforms improve and speed up feedback, allowing students to govern their own learning (Nicol & Macfarlane-Dick, 2006). Online quizzes and real-time feedback systems, in particular, provide learners with an immediate sense of where they are - allowing them to adjust their approach while the content is still fresh, rather than waiting until the final mark is received.

Personalization comes second. Adaptive learning technologies and intelligent tutoring systems work with each learner's pace and ability (Dabbagh & Kitsantas, 2012). And because students may progress at their own pace and obtain assistance just where they are stuck, motivation and engagement typically increase.

The third option is to collaborate. Discussion forums, virtual classrooms, and cloud-based document sharing are examples of tools that enable genuine real-time collaboration (Garrison and Anderson, 2003). Students end up making things together, exchanging ideas, and providing comments, and the classroom quietly transitions from passive listening to active engagement.

However, none of these consequences occur on their own; the teacher is at the center of each one. Using the TPACK paradigm, Mishra and Koehler (2006) suggest that technology integrates best when three types of knowledge overlap: technological, pedagogical, and content. Educators who receive sufficient training and support are more likely to construct dynamic classes that address a variety of learning requirements. This means that professional development in digital competences, instructional design, and digital assessment is not an optional extra; it is essential.

According to Luckin et al. (2012), digital pedagogy saves teachers time by streamlining grading and feedback. Learning management systems and digital grading platforms allow teachers to track student performance in real time, resulting in less administrative work and better and more frequent feedback.

Two obstacles keep arising. The first is a digital divide. Selwyn (2010) illustrates how unevenly devices and connectivity are distributed, with students from impoverished homes frequently lacking the access required to participate in digital learning at all. And when teaching relies more and more on technology, that gap transforms into exclusion – an equality issue that no amount of brilliant pedagogy can solve on its own.

The second is capability. Many teachers excel at traditional pedagogy but fail to incorporate digital technologies into their practice, and digital literacy programs designed to assist teachers and students alike are inconsistent, at best. The standard solution is ongoing professional growth. It works, but only when done consistently; one-time sessions are less likely to remain.

Objectives of the Study

1. Determine the effectiveness of student-centered techniques, such as digital pedagogy, in promoting independent learning and improving academic achievements.

2. Investigate how digital technologies for collaborative learning impact student engagement, motivation, and teamwork.

3. Analyze how digital pedagogy enhances flexibility and adaptability in teaching and learning, including personalized learning pathways and adaptive assessment.

4. Evaluate the effectiveness of digital grading, assessment, and feedback systems in improving teacher efficiency, student feedback, and overall learning results.

Material and methods

We employed the descriptive survey approach, which is appropriate for our study because the purpose was to characterize practice as it is, rather than to change it. Purposefully chosen respondents included 50 teacher educators and 150 students from teacher education institutes, for a total of 200 participants between the two groups. Two distinct questionnaires were created and ran through Google Forms: one for teacher educators and one for student teachers. The items allowed for several responses, therefore the percentages within each question totaled more than 100. The responses were then evaluated using content analysis and reported on objectively.

Results and discussion

So, what are the teacher educators telling us? For collaborative work, online collaboration platforms came out on top with 82% - while 4% indicated they use no digital tool at all, and another 2% had no idea such tools existed. The pattern was similar for flexible learning, with learning management systems coming out on top at 80%, followed by 4% non-users and 2% ignorant. Workshops were the obvious favorite for professional development, accounting for 78%, with the remaining 8% coming through other means. In grading and assessment, the learning management system again took the lead with 86%, followed by online quiz tools at 62%.

Purpose	Tool	n	%
Collaborative learning	Online collaboration platforms	41	82
	Social learning platforms	34	68
	Video conferencing tools	33	66
	Gamification tools	22	44
	Not using yet	2	4
	Not aware of such tools	1	2
Flexible learning	Learning management system	40	80
	Online discussion forums	36	72
	Video conferencing tools	33	66
	Adaptive learning platforms	26	52
	Not using yet	2	4
	Not aware of such tools	1	2
Continuous professional development	Workshops	39	78
	Online courses	33	66
	Self-directed learning	31	62
	Conferences	29	58
	Peer mentoring	29	58
	Other / not using	4	8
Grading and assessment	Learning management system	43	86
	Online quiz tools	31	62
	Assessment management systems	30	60
	Other / not using yet	4	8

Table 1. Digital tools reported by teacher educators, by purpose

In contrast, student instructors reported using everything more heavily – in all categories, without exception. Online collaboration platforms received 96 percent of the votes, while learning management systems received 96.7% for flexible learning and 98.7% for grading and assessment, leaving only 4.7 to 8% for other tools. And one point is worth noting: not a single student instructor stated that they were ignorant of the instruments available.

Purpose	Tool	n	%
Collaborative learning	Online collaboration platforms	144	96
	Video conferencing tools	138	92
	Social learning platforms	138	92
	Gamification tools	123	82
	Other tools	10	6.7
Flexible learning	Learning management systems	145	96.7
	Online discussion forums	138	92
	Video conferencing tools	134	89.3
	Adaptive learning platforms	124	82.7
	Other tools	7	4.7
Grading and assessment	Learning management systems	148	98.7
	Online quiz tools	134	89.3
	Assessment management systems	128	85.3
	Other tools	12	8

Table 2. Digital tools reported by pupil teachers, by purpose

Discussion

The first is how everyone converges on the same few platforms. Whatever group you look at, and whatever the aim, the learning management system and online collaboration platform are at the top. That kind of concentration does have advantages, such as shared workflows, a single thing to teach people on, and records kept in one location. However, there is a drawback: the risk of pedagogical homogeneity. An LMS used primarily as a filing cabinet and gradebook will not achieve the constructivist or connectivist benefits that the literature continues to promise. The survey can tell us that tools are being embraced, but it cannot tell us how extensively they are used. That gap - between utilizing a tool and using it successfully - is where the difficult part of digital education lies.

The second pattern shows a consistent gap between the two groups. On comparable goods, student teachers report utilization rates ranging from fourteen to thirty-eight percentage points higher than their educators. Gamification is the most severe example: 82 percent for student teachers and only 44 percent for teacher educators. Some of this is certainly generational; students grew up with it. However, some of it is about role: pupils are given whatever tools the institution requires, whereas an educator must evaluate whether a certain tool deserves to be included in a class. Regardless, the imbalance is important. When students are more familiar with technology than those teaching them to teach, the entire modeling function of teacher education begins to shake.

Then there's the third pattern: a tiny group of educators who claimed no use or awareness of the necessary tools. In a sample of fifty, 4% and 2% appear to be random noise. I would argue that they shouldn't be. A teacher educator who hasn't heard of collaborative or flexible-learning platforms by 2024 isn't just a little behind on software; their student teachers will come into classrooms having never seen those methods modeled. And there's a silent issue lurking beneath the numbers: organizations typically have no idea which employees fit into this category until something goes wrong.

Finally, the professional growth results provide both a roadmap and a warning. Workshops topped the list with 78%, although self-directed learning and peer mentorship both received a significant proportion. The appeal of workshops is understandable; yet, research on teacher effectiveness shows that one-time events rarely change what happens in the classroom. To me, the more hopeful signal is the 58% for peer mentorship, because it is precisely this type of continuing, collegial assistance that tends to turn awareness into a real habit.

Findings

1. Both groups primarily use online collaboration tools for collaborative learning.
2. The learning management system is the most popular instrument for both teacher educators and student teachers.
3. Workshops are the recommended way for teacher educators to maintain their professional development.

4. Learning management systems and online quiz tools are the most commonly used instruments for grading and assessment.

5. Pupil teachers typically embrace more instruments than educators in all comparable categories.

6. A minority of teacher educators do not use or are unfamiliar with appropriate digital tools.

Implications and Recommendations

Move professional development from tools to design. Because fundamental adoption is already high, there's minimal purpose in instructing people on which buttons to press. Instead of focusing on platform mechanics, more emphasis should be put on design decisions such as when a discussion forum outperforms a seminar, how to sequence adaptive assessment, and what makes peer feedback truly meaningful.

Don't let workshops stand alone. People enjoy workshops, so keep them; just correct their well-known fault by incorporating peer mentorship cycles and classroom observation throughout each one. That manner, a single occurrence becomes the beginning of a prolonged process rather than a box that has been checked.

Audit the unaware few. A simple annual competency check would allow institutions to identify personnel who aren't using the core tools and then offer tailored assistance rather than the same generic training everyone receives.

Convert the imbalance into something valuable. Where student instructors are more proficient with a tool than their educators, reverse-mentoring can transform what appears to be an embarrassment into a true benefit – as long as the educator maintains control of the pedagogical framing.

Limitations

A few disclaimers are in order. Because the sampling was purposeful and limited to teacher education institutes, the findings accurately reflect this specific group rather than a national population. The questionnaires also collect self-reported usage, which is a good proxy for exposure but not for how profoundly or effectively a tool is utilized. Then there's the uneven group sizes: with fifty instructors and one hundred and fifty students, one educator's response shifts the educator percentage by a whole two points. And because the entire design is cross-sectional, it cannot determine whether adoption is increasing, leveling off, or deepening. Classroom observation, analysis of student output, and some longitudinal follow-up would all help to address a different one of these limitations.

Conclusion

Learning management systems and collaboration platforms are almost universal among student teachers and firmly established among their educators, and both groups use digital tools for collaboration, flexible learning, and assessment. The evidence suggests that digital pedagogy is no longer an innovation waiting to be accepted, but rather a settled part of teacher education. It has also spread far beyond online and hybrid teaching: through

What the data cannot tell us is if all of this acceptance has resulted in a significant shift in pedagogical aim. And that, in the end, is the question the field should pursue next. The tools are already in place; the challenge now is to ensure that they are used for the reasons the theory promises - learner agency, networked knowledge, meaningful feedback - rather than just because they are there.

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