

A Thematic Analysis of Teacher Readiness and Ethical Integration for AI in Primary Education

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Abstract

Artificial intelligence (AI) is fast changing primary education, which brings up some hard questions. We must rethink how ready teachers are for this shift; it is not just about tech skills. AI can personalize learning and help school admin, but these discussions frequently miss the teachers who must do the use. I did a study asking twelve primary school teachers questions and reviewed their answers. Five main themes came up. First, teachers had different ideas about AI. Some viewed it as helpful, while others worried about downsides. Second, they felt that using AI in teaching should be based on what we know works, putting together tech, teaching style, and subjects. Third, teachers knew a lot about ethical issues, like data ownership, AI bias, and keeping human connections with students. Fourth, there were time, tech, and teamwork problems. Fifth, teachers wanted input and a role in creating and controlling how AI gets used. We should see teachers as helpers that shape how AI is used, not just users.

Keywords: Artificial Intelligence in Education, Teacher Readiness, Thematic Analysis, Primary Education, Technological Pedagogical Content Knowledge

1. Introduction

AI's entrance into primary education is a major shift, both technologically and in how we think about teaching. Some people think AI systems can create very specific learning paths for each student (Pataranutaporn et al., 2021), give instant feedback (Sichterman et al., 2025), handle routine tasks, and help students with different learning styles (Li, Yu & Zhang, 2024). This idea is showing up in government plans, such as the European Union's Digital Education Action Plan, which says AI skills are key for future education. There are many new education tech tools that claim to change learning through machine learning and data analysis.

But there is a problem with this optimistic view: it often misses the teacher's actual experience in the classroom. Research shows that a teacher's beliefs, knowledge, and work environment greatly affect whether a new technology succeeds (Tondeur et al., 2017; Bowman et al., 2022). AI brings new problems. Unlike older tools, many AI systems are like black boxes. We do not really know how they make decisions. This raises questions about who is responsible, whether the AI is biased, and what it means for teaching (Williamson, 2023; Gillani et al., 2023). So, how ready teachers are to use AI is very important for how AI will be used in education.

This paper looks at what's missing in the AI in Education research. A lot of studies look at how well the AI works, how students perform, or how the AI systems are designed. But there is not enough research into teacher readiness. Here, readiness means more than just technical skills. It is about how well a teacher can use AI in their specific situation (Wang et al., 2023; Krueger et al., 2021). It includes how they think about AI, their ability to use it in teaching, their understanding of ethical issues, and their ability to make choices within the rules of their school.

The research questions are listed as follows.

- (a) How do primary school teachers think about the role of AI in education?
- (b) What guides how they use (or don't use) AI tools in their teaching?
- (c) What ethical problems do they worry about when using AI?
- (d) What things make it hard or easy for them to use AI?
- (e) What support do they need to feel confident using AI in a responsible way?

By carefully studying interviews with twelve primary teachers, this study goes beyond just talking about theories and policies. It looks at the real experiences and opinions of teachers. The results show that teachers are carefully thinking about AI and its ethical issues. This challenges the idea that teachers will either easily accept AI or automatically reject it. By focusing on the teacher's point of view, this study helps us rethink how to train teachers, create policies, and design technology. This will lead to a more sustainable, fair, and human-centered future for AI in primary schools.

2. Literature Review

To understand if teachers are ready to use AI, we need to look at how technology, teaching methods, ethics, and the school environment all work together. This study uses three connected ideas.

2.1 Technological Pedagogical Content Knowledge (TPACK) and AI

The TPACK idea (Taopan, Draji & Sumardi, 2020) says that to use tech well in the classroom, teachers need to know about technology (TK), teaching (PK), and the subject they are teaching (CK). Using AI is something new, so teachers need to understand Technological Pedagogical Content Knowledge - Artificial Intelligence (TPACK-AI) (Kim et al., 2022; Karataş & Ataç, 2025). This means

knowing how an AI tool works (TK) and how its math works with teaching ways (PK) to teach a subject (CK). For example, if a teacher uses an AI to help write stories (TK) to teach how to build stories and make characters (CK) by having students work together to critique and change the stories (PK), that is TPACK-AI. Teachers want examples of how to teach with AI, which shows they understand they need to know how all these things connect.

The TPACK structure is helpful when thinking about adding technology into teaching. But it has received some disagreement, especially when it comes to AI. First, people tend to dislike that TPACK does not consider context. It shows different areas of knowledge as separate and able to be switched out. This way of thinking can downplay the school environment, the available resources, and rules that influence how integration is achievable. Second, because it focuses on one teacher's knowledge, it can overshadow outside issues. Things like business from educational technology sellers or unfair infrastructure, which have more say in how technology is used than a teacher's skills (Durham, 2024). Most importantly for AI, TPACK treats technology as a simple tool. It sees tools as ways to reach teaching goals. This goes against many AI systems. AI systems are active, unclear (black box), and full of values. They change teaching interactions and make choices instead of just following what the teacher wants. So, when using TPACK for AI, it needs to change. It should go from adding a tool to dealing with an active system with ethical issues.

2.2 Ethics, Care, and Professional Identity

Being ready to teach involves more than just knowing skills and how to teach. It also means having strong ethics and beliefs, which are closely linked to how teachers see their role. Teachers do not just teach facts; they guide students and look after their well-being, fairness, and overall growth. This view shapes teaching as a caring job based on values. When AI is used in schools, it affects this view, pushing teachers to balance new technology with their core values.

A key balance is protecting student data and mental well-being in AI systems. Teachers must shield students from their data being used for business or watched too closely which becomes a worry as AI gathers lots of data on students. Also, teachers should check if AI programs are fair and don't widen the gap between students. They should ask if AI tools help some students while hurting others because of hidden biases in what the AI suggests, how it tests, or how it keeps students involved. They also need to deal with the fact that some schools have the newest technology, while others lack basics, which can make inequality in learning worse (Farahani & Ghasemi, 2024).

Most importantly, using AI touches on keeping the student-teacher bond strong. Teachers often see their job as creating a caring bond that helps students grow socially, emotionally, and with empathy, things machines cannot do. The worry that AI might make learning impersonal, turning teachers and students into just numbers, is a big fear. When teachers worry about these issues, they are not just unsure about the technology; they are defending their ethics against tech systems that are uncontrolled and driven by money. This ethical view is key to being ready, which

means not just learning to use tools but talking honestly about the moral sides of using technology.

2.3 Sociometrical and Ecological Perspectives

To get what it takes for teachers to be ready, we need to look beyond just what individual teachers lack and consider the bigger picture. In this view, being ready depends on the whole school system and how it's connected. Technology is not just a tool, but part of a setup of people, actions, rules, buildings, and culture. In this system, teacher readiness is not just something a teacher has but something that comes from the system itself, created together by people and things.

From this point, what we see as problems become parts of the environment that shapes readiness. For example, when teachers have time to plan, it affects how well they can try out and change AI tools. How leaders think and use resources sets the tone, either promoting new ideas or causing worry. Things like internet access, devices, and classrooms either help or stop tech from being used. Even rules, like how things are bought, data is kept private, and things are approved, are part of what teachers deal with daily.

This idea explains why even excited and skilled teachers can be held back by the system. A teacher might have the skills and values to use AI well, but they can be stopped by slow rules, not enough internet, programs that do not work together, or a school that does not like change. On the other hand, a helpful setup (with technological support, teamwork, good leaders, and ethical rules) can add to what teachers can do, leading to real and careful use of technology. So, to make teachers ready, we must look at these connected pieces, knowing that lasting positive changes need us to focus not just on what teachers know but on the whole system where they teach and learn.

3. Research Methodology

3.1 Research Design and Rationale

This study adopted a qualitative, interpretive research design, using semi-structured interviews as the focus method. A qualitative way is key to look into the complicated and personal parts of teacher beliefs, what they've learned from experience, and their ethics that surveys do not really get (Braun & Clarke, 2021). The semi-structured setup kept things on track with the main topics but still let us dig into new ideas and special situations.

3.2 Participant Selection and Context

Twelve primary school teachers were picked on purpose to get a range of views on how ready they think they are for AI.

(a) Teaching experience -- From 2 to 28 years (Mean: 12.25, Standard Deviation: 7.6). This includes both new teachers who grew up with tech and experienced teachers with lots of teaching knowledge.

(b) Subject specialization -- English Language (2), Mathematics (2), Chinese Language (1), General Studies (2), Art (2), Music (1), Computer Skills (1), Putonghua (1). This covers regular, creative, tech, and language subjects, knowing that the subject affects how they use technology.

(c) School Type -- Government (2), Aided (7), Private or Other (3). This shows the different ways schools are run and funded.

This careful selection helps find common themes and shows how teacher readiness (Rajapakse, Ariyaratna & Selvakan, 2024) depends on the job.

3.3 Data Collection

Virtual, one-on-one interviews, lasting 45-60 minutes, were conducted using a protocol designed to elicit rich narrative data. The protocol moved from descriptive practice to reflective and ethical reasoning:

- (a) Integration of digital tools in teaching (establishing a TPACK baseline).
- (b) Mental models and associative meanings of AI in education.
- (c) Encounters with and use of specific AI-powered educational tools.
- (d) Perceived differences between AI and traditional educational technology.
- (e) Primary concerns regarding data privacy, equity, student well-being, and professional role.
- (f) Practical, institutional, and systemic barriers and enablers.
- (g) Ideal forms of support, training, and professional involvement in the AI ecosystem.

All interviews were audio-recorded, transcribed verbatim, and anonymized.

3.4 Thematic Analysis Procedure

Data analysis followed the six-phase reflexive thematic analysis approach as outlined by Braun and Clarke (2021), emphasizing an organic, data-driven process.

- (a) Getting to know the data -- Reading through everything and taking notes.
- (b) Initial codes -- Going through the data line by line with NVivo software (Allsop et al., 2022), finding important parts.
- (c) Finding themes -- Grouping codes into possible themes, seeing how they connect.
- (d) Checking themes -- Making sure the themes fit the data and are clear.
- (e) Naming themes -- Describing each theme clearly and simply.
- (f) Writing the report -- Putting the story together, using good examples, and fitting it into the wider research.

The analysis was mostly based on the teachers' words but kept in mind the ideas from Section 2. To make sure the study was trustworthy, the researcher kept track of decisions, gave a detailed account of what was happening, and used direct quotes from the teachers.

4. Findings

The study found five connected ideas that show how ready teachers are to include AI in elementary schools.

4.1 Theme 1: What Teachers Think About AI

What teachers initially think about AI in education greatly impacts their involvement with it, ranging from seeing it as a helpful tool to a possible danger.

- (a) AI to make learning personal and efficient

Teachers who teach basic reading and math often see AI this way, agreeing with common educational technology marketing. They think AI is a good way to customize learning and automate tasks. Ms. A (English, 2 years) said, I imagine software that changes to fit each kid's level, like a personal reading tutor. Ms. E (Chinese, 15 years) also mentioned personalized learning and automated admin work. This view is usually tech-positive, seeing AI as a natural advancement of current tools to better handle teaching problems like diverse classrooms.

- (b) AI as a risk to personal teaching methods and development

Some experienced teachers in creative fields like Arts and Montessori see AI as harmful. They value human interaction, creativity, and comprehensive growth. Mr. B (Mathematics, 28 years) expressed strong doubt. He thinks of movies where kids are hooked up to machines. It seems like fancy software that over-promises. His worry was the loss of human interaction, which he believes is crucial. Ms. J (Mathematics, 14 years) viewed AI as against our beliefs, which favor hands-on experience over screen time. Ms. H (Visual Arts, 6 years) criticized AI-created art as emotionally lifeless, arguing it skips the creative steps of effort, revision, and personal touch. This idea is a protective stance, defending a vision of childhood and education against technology.

- (c) AI as a helpful partner for empowerment and inclusion

A more balanced idea came from teachers using technology to meet specific student needs, especially in special education. They saw AI as a flexible partner, not just a tool or threat. Ms. C (Chinese, 10 years) noted that standard assistive technology is fixed, but AI-powered technology is flexible; it learns how a student struggles and changes itself. It is more than just a tool. She sees it as empowering, allowing a non-verbal student to lead a class discussion or a student with dysgraphia to write a great poem. Mr. D (General Studies, 12 years) noted it can change student involvement, making them content directors instead of just listeners. This goes beyond automation, seeing AI to redefine ability, access, and involvement.

4.2 Theme 2: Pedagogical Integration and the Evidence Imperative

Teachers put AI to a practical test, no matter how it was first designed. They judged its worth based on how well it fits into their teaching plans. This lines up with the idea of TPACK-AI, where technology must have a real reason to be there.

- (a) Using AI with a clear goal

The teachers who used AI well did not just use it for the sake of using it. They tied it to certain learning goals and made it part of their lessons. For example, Ms. A used an AI story maker to get her students' creativity going. They used the AI's stories as a starting point and then wrote their own endings. Mr. I liked an AI tool that gave him quick feedback. He said it gave him data to plan lessons, which let him customize his teaching right away.

- (b) Wanting proof and reasons

Teachers were wary of AI tools that did not have proof they worked. Mr. B wanted proof that the AI produces better results than what I already use. So, they don't like training that just shows them how to use the technology.

They'd rather learn why it is useful for teaching. Mr. B said that support should tie the AI to current learning styles. Ms. A wanted real examples of teachers like me using it, especially with specific learning objectives – they need to see how technology, teaching, and subject matter work together in a real classroom setting.

4.3 Theme 3: Ethical Imperatives as the Foundation of Trust

Teachers were not just casually thinking about ethics; it was a major, sometimes overwhelming, factor in whether they wanted to use AI. They saw themselves as the ones who should make sure AI is used ethically, and their concerns showed they understood the broad social effects of AI.

(a) Data privacy, security, and the black box

This was the biggest and most talked-about worry. Teachers said they felt very responsible for student data in a system that's hard to understand and driven by business. Mr. B found the standard terms of service impossible to understand, and the way data flows really disturbing. Ms. C, who works with special needs students, said protecting data was simply an ethical must. This has created careful practices: sticking only to approved tools, not putting student info into open AI platforms (Ms. A), and, for some, like Ms. K (Music), avoiding all data-collecting tools for young kids. The black box nature of many AI programs makes this worry worse, since it is unclear who is responsible if data is misused or leaked.

(b) Equity, access, and algorithmic bias

Teachers were clearly aware of how AI could make existing inequalities even worse. They pointed out the basic problem of access to technology: Ms. E said her main problem was just having the tech, and tools that need constant fast internet automatically leaving out underprivileged students and schools. More subtly, they saw the dangers of bias in the AI itself. Ms. C asked a pointed question: if AI systems are mostly trained on data from typical children, would they see normal differences in neurodiverse learners as problems? This thought lines up with the documented problems caused by biased data in other areas, showing teachers are aware of fairness and justice issues that go beyond what's happening in their classrooms.

(c) Keeping human connection and childhood whole

A deep worry focused on how AI could affect the important relationships in education, which are seen as key for social and emotional growth. Mr. B described this as possibly losing the mentoring from a supportive adult who sees their struggles and celebrates their wins. This worry goes to the heart of how kids grow. Ms. J and Ms. K cautioned against making screen-based childhood normal and less human interaction during key growth stages. For them, AI could lead to a narrow view of education that ignores play, imagination, teamwork, and empathy, things they think are essential in primary education.

4.4 Theme 4: The Gauntlet of Systemic and Practical Constraints

Readiness is not just about what a person can do; the social and physical environment around them plays a big part. Teachers mentioned some tough, built-in system

issues that hold people back, no matter how driven or skilled they are.

(a) Time crunch and app fatigue

The biggest problem was simply not having enough time. It takes a lot of extra unpaid work to investigate, try out, learn, use, and assess new tools. Teachers are already swamped. As one teacher put it, I do not have the time. This is made worse by app fatigue, where teachers get tired and doubtful from always being pushed to use new programs without getting rid of the old ones, which causes burnout and doubt about new ideas.

(b) Outdated technology and slow system

Teachers often struggle with bad or old technology (like slow tablets, as one teacher mentioned), slow purchasing and approval processes (especially for special education tools), and technology that does not work well together. New AI tools do not connect to the current student systems, which just creates more work. One teacher brought up the main issue of basic internet access, something often overlooked in policy talks, but which is key to using AI tools online.

(c) Inconsistent school culture and plans

The school leaders and overall work environment greatly change how ready teachers are to try new things. For example, one teacher described an innovative school which learns from mistakes and has organized teamwork. This is different from the careful, slow, and independent environment described by another, or the overwhelmed leaders with no real plan noted by another teacher. This inconsistency makes for a huge difference in student experience, as new ideas depend on the hard work of individual teachers who do it themselves with AI, instead of the school system building skills and sharing teaching methods.

4.5 Theme 5: The Demand for Co-Design and Professional Governance

A key uniting idea was teachers' strong desire to be seen as experts and to have a real say in how AI is used in education (Fitria, 2021). They really did not want to be just passive end-users as many outsiders saw them.

(a) Teachers as co-designers

Everyone agreed that tools that work in the real-world classroom cannot be created without teacher input. Ms. C said that teacher involvement was a must, as developers without special needs of experience make tools that do not work. Ms. A wanted developers to observe the classroom environment and create tools that address real problems. This pushes teachers to be involved in the design process (Lin & Van Brummelen, 2021), since teachers have important knowledge about how teaching works, student behavior, and what's practical.

(b) Teachers as best testers

Teachers felt the only way to judge an AI tool's worth was to see how it performs in an actual, messy classroom over time. Mr. B suggested long-term, real-world trials, where teachers can use the tool for a whole semester and provide feedback on its real value, not just its attractive features. This makes teacher feedback the most important measure of success.

(c) Teachers as ethical protectors

Teachers want a voice in policy and ethics. Ms. K viewed AI as affecting working conditions and teacher independence, saying that teachers' unions need to be involved in AI decisions. Teachers worry about being watched by management, increased workloads from new monitoring, and the profession becoming less skilled. They want to control how technology is brought in and used, making sure it matches their ethics and protects students and their teaching.

5. Discussion: Reconstructing Readiness for an AI-Infused Future

The thematic analysis shows that teacher readiness for AI is complex and easily affected by ethical worries and system problems. The results question models that blame teachers for slow acceptance of AI. Instead, they suggest that system and design problems weaken even the most enthusiastic teachers. To create real, lasting readiness, we need to change our approach in four areas.

5.1 From Skills Training to Teaching Culture

Current professional development mainly aims at operational skills. The data calls for a shift to teaching culture, where teachers work together in groups to create and assess AI in teaching.

(a) Learning through practice -- Use structured, on-the-job chances like Lesson Study or Action Research groups where teachers plan, carry out, and think about AI-integrated lessons together. This focuses on improving practice in specific subjects, valuing teaching reasoning over technical skill.

(b) Teacher-led tool review -- Support the creation of teacher-led, independent review platforms (like Consumer Reports for EdTech). These would judge AI tools based on teaching use, clear proof, and moral checks (data policies, bias information), meeting teachers' need for proof and building professional knowledge networks.

5.2 Co-Constructing Ethical Frameworks

Just sticking to compliance rules from the top won't fix the big ethical worries we've found. We need to build trust by working together to set standards and be open about what is going on.

(a) AI ethics groups at schools -- Every school should have a group with teachers, leaders, parents, student representatives, and ethics experts. They would check out any new AI stuff, help write the rules for using it, and talk to companies about how they handle data. Teachers need to be a big part of these groups to make them work right.

(b) Easy-to-understand AI reports -- Regulators should make companies give AI reports for education tools. These reports need to say where the data comes from, what the tool can and cannot do, if it has any biases, how it makes decisions, and how data is handled. This helps deal with worries about AI being a black box and helps us judge if it is fair.

5.3 Teacher Time is Important

To get ready for AI, we need to realize that teachers' time, thinking power, and well-being are super important.

(a) Give teachers time for AI -- Change teacher contracts and schedules to give them time to learn about tech, plan

together, and try things out. This time should be a priority and seen as part of their job, not something extra.

(b) Invest in what teachers need -- When deciding where to spend money, do not just buy the newest software. Make sure teachers have good internet, devices, and systems that work together. Like Ms. E said, even the coolest AI tool is useless if teachers cannot even connect to it.

5.4. Teachers as Partners, Not Just Users

We learned that teachers really want to have a say. So, we need to change how education companies, politicians, and teachers work together.

(a) Teachers help design technology -- When companies get money to build education technology, they should have to include teachers. Teachers should get paid to help find problems, test ideas, and give feedback.

(b) Funds for teacher ideas -- Give money to teacher teams so they can fix problems in their classrooms and find new solutions. Let them test new tools without a lot of rules so they can find out what works.

6. Conclusion

This thematic analysis shows that adding AI to grade school is not just about tech; it's about dealing with social, professional, and moral issues. The teachers in this study aren't unprepared. Instead, they are often more prepared. They think about morals, understand teaching methods, and know the possible dangers to kids and education better than the programs that should be helping them.

The readiness gap is not that teachers are lacking. It is that the system is not using their full skills and power. Teachers are willing to guide AI's use in a thoughtful, moral, and creative way. But systems and companies often treat them like simple users. For AI to be included fairly and lastly, we need to switch from just giving technology to teachers to letting them be leaders. This means they would guide how AI is used morally and educationally.

The future of AI in primary schools will depend on the everyday decisions teachers make in their classrooms. It is crucial that we support them with tech that is open, fair, and focused on helping them teach. Policies should ensure teachers are involved in the process, and schools need to give them the time, trust, and resources to make good choices. The most important thing is that those making the technology, policies, and decisions listen to and learn from teachers, because they know what is best for teaching and learning.

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