Exploring K–12 Teacher Motivation to Engage with AI in Education

Ethel Tshukudu
ethel.tshukudu@sjsu.edu
San José State University
San José, United States

Katharine Childs
k.childs.1@research.gla.ac.uk
University of Glasgow
Glasgow, United Kingdom

Gaokgakala Alogeng
gcletebele@gov.bw
CSEdBotswana
Gaborone, Botswana

Emma R. Dodoo
edodoo@umich.edu
University of Michigan
Ann Arbor, United States

Douglas R. Case
doug.case@sjsu.edu
San José State University
San José, United States

Tebogo Videlmah Molebatsi
tmolebatsi@thutonet.ac.bw
Kgale Hill Junior Secondary School
Gaborone, Botswana

Abstract

While global interest in K–12 AI and ML education grows, many African education systems lack foundational computing education beyond basic computer literacy. This creates unique challenges for AI integration in countries where computer science isn't part of the K–12 curriculum. Teachers are central to this effort, but little is known about what motivates them to engage with these technologies or how they use them. This study examined what motivates K–12 teachers to engage with AI and ML in Botswana. Using a mixed-methods approach, we surveyed 59 teachers using an adapted version of the Motivation to Teach Computer Science (MTCS) scale and open-ended questions. We used Self-Determination Theory (SDT) as a lens to interpret the findings. Results showed that intrinsic motivation and identified regulation were primary drivers. Context-specific, extrinsic factors were also observed, including a desire to improve educational systems and concerns about infrastructure in schools. Access disparities in teachers' use of AI emerged: secondary and computing teachers with better infrastructure used AI tools more frequently than primary or non-computing teachers. The results show that while teachers' engagement with AI stems from perceived teaching and learning value, sociocultural factors like infrastructure determine how motivation translates into practice. These findings have implications for professional development, infrastructure planning, and inclusive AI adoption in resource-constrained education systems.

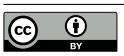
CCS Concepts

• **Social and professional topics → K-12 education**; • **Computing methodologies → Artificial intelligence**;

Keywords

K-12 education, artificial intelligence, teacher motivation

ACM Reference Format:
Ethel Tshukudu, Katharine Childs, Gaokgakala Alogeng, Emma R. Dodoo, Douglas R. Case, and Tebogo Videlmah Molebatsi. 2026. Exploring K–12 Teacher Motivation to Engage with AI in Education. In *Proceedings of the 57th ACM Technical Symposium on Computer Science Education V.1 (SIGCSE TS 2026), February 18–21, 2026, St. Louis, MO, USA.* ACM, New York, NY, USA, 7 pages. https://doi.org/10.1145/3770762.3772632



SIGCSE TS 2026, St. Louis, MO, USA

ACM ISBN 979-8-4007-2256-1/2026/02
https://doi.org/10.1145/3770762.3772632

1 Introduction

Artificial intelligence (AI) is a field within computer science that often uses machine learning (ML) to learn from human data [23], and is becoming increasingly embedded in everyday life. As a result, more countries include AI topics in K–12 education [24]. However, in many African countries, including Botswana, this goal is challenged by foundational gaps in computing education. Most students in Botswana receive only basic digital literacy instruction (e.g., Microsoft Office), with little or no exposure to programming or computational thinking [28]. Despite this, students are beginning to encounter generative AI tools in informal settings [15]. This creates a critical tension that AI is reaching classrooms faster than teachers are being prepared to teach it.

Teachers play a central role in shaping how emerging technologies enter the classroom, especially in contexts where formal curricula lag behind rapid technological change [28]. Yet, while existing research has explored teacher motivation in general and in some cases, motivation to teach computing or AI in the Global North [2, 29] there is limited empirical work from African contexts that investigates what drives teachers to engage with AI and ML, how they are using these tools, and what challenges they face. Prior African studies have focused on attitudes and behavioral intention using frameworks like the Theory of Planned Behavior, without measuring specific intrinsic and extrinsic motivational factors [21, 22].

This study contributes to the growing field of AI education by presenting the first mixed-methods investigation of K–12 teachers' motivation to engage with AI and ML in Botswana. Drawing on Self-Determination Theory (SDT), we examine how intrinsic and extrinsic factors shape teacher motivation in an under-resourced education system. In addition to analyzing motivational patterns, we explore how teachers currently use AI tools.

We address the following research questions:

(1) **RQ1-What motivates teachers in Botswana to engage with AI and ML in education?**
(2) **RQ2-How do teachers currently use AI tools in their teaching practices?**
(3) **RQ3-What affordances and challenges do teachers perceive about adopting AI in education?**

2 Theoretical framework

Self-Determination Theory (SDT) [19] describes the basic human need and capacity to make choices and control one's own life. It encompasses the ability to act according to one's own will, values, and interests rather than being controlled by external forces or pressures [9], and is a widely used framework to examine the motivation processes of teachers [1].

SDT is operationalized as a continuum of motivation (see Figure 1), from amotivation, where an individual lacks the intentionality to act; through extrinsic motivation from external factors; to intrinsic motivation driven by inherent interest [16]. Three psychological needs are identified for intrinsic motivation: autonomy (a sense of control), competence (feeling effective), and relatedness (connection to others). Four types of extrinsic motivation represent increasing levels of internalization, progressing from external regulation (compliance or reaction to rewards or punishments), through introjected regulation (obtaining approval from self or others), to identified regulation (recognizing and endorsing the value of an activity), and finally to integrated regulation (where externalizations are congruent with one's core identity and values) [20]. In more recent work, Deci and Ryan argue that more autonomous forms of extrinsic motivation can support psychological well-being and do not necessarily undermine intrinsic motivation [20].

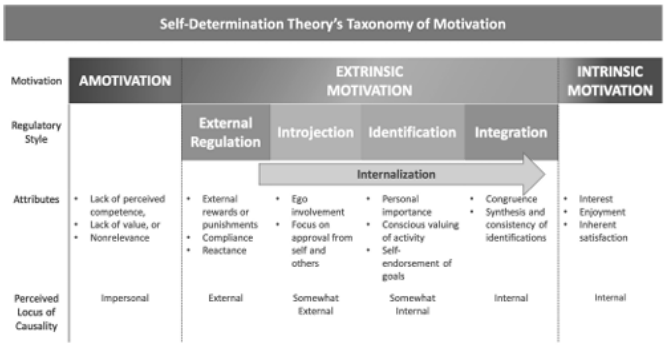


Figure 1: Self-determination theory motivations continuum [20]

3 Background and prior work

In this section, we situate our study within the context of two dimensions of teacher motivation in K-12 education: teacher motivation to learn about and use AI (artificial intelligence) and ML (machine learning), and variations of teacher motivation in urban and rural contexts. Our focus is on research carried out in the Global South, although we also build on work carried out around the world.

3.1 Teachers' Motivation to Teach and Learn about AI and ML

Understanding what motivates teachers to engage with AI and ML, both in terms of teaching and personal learning is an emerging area of research. While several studies have applied Self-Determination Theory (SDT) to examine teacher motivation in this area, work is limited in geographic diversity. Previous studies that have applied SDT found that intrinsic motivators such as personal enjoyment and autonomy emerged as key drivers in both qualitative and quantitative findings [2, 29]. For example, interview data with K-12 teachers (n=8) in England showed that they were partly intrinsically motivated to teach AI in schools [2]. In the same national context, a survey of teachers (n=28) using the Motivation to Teach Computer Science (MTCS) scale [16] also found strong intrinsic motivational factors such as personal enjoyment [29]. However, extrinsic motivation has largely been treated as monolithic and remains underexplored in the literature.

To date, work exploring teachers' motivation to learn about AI in K-12 settings in Africa has focused on the relevance of AI, their attitude towards using AI, the use of AI for social good, and teacher confidence [14]. For example, Ayanwale et al. [4] examined in-service teachers in Namibia using Theory of Planned Behaviour and found that their intention to teach AI was strongly predicted by attitudes, confidence, and perceived relevance. In several studies in African countries, teacher self-efficacy consistently predicted both the intention and readiness to introduce AI content [11, 14]. However, teachers reported challenges including insufficient training, a lack of contextually relevant resources, and limited professional development opportunities [11, 14, 28]. Given that teachers often decide how and when to introduce AI concepts into the classroom [21], this study applies SDT to systematically examine both intrinsic and extrinsic motivational factors among teachers in Botswana.

3.2 Contexts Influencing Teacher Motivation

Prior work in teacher motivation in African countries has often compared urban and rural settings, particularly in relation to recruitment, retention, and job satisfaction. However, this work has not examined teacher motivation in the context of emerging technologies like AI and ML, nor has it systematically investigated how contextual factors shape teachers' readiness to adopt new technological content into their practice.

Intrinsic motivation is a key factor underlying middle and high school teacher satisfaction across both urban and rural settings [17]. In urban districts, instrinsic motivators such as professional autonomy and personal achievement generally drive job satisfaction [5]. However, studies in urban Nigeria and rural Tanzania have shown that while intrinsic motivation remains important, extrinsic factors such as incentives, resource availability, and teacher accommodation also influence teacher motivation in African contexts [3, 18]. The limited existing literature on teacher motivation in Botswana predates the recent advancement of AI tools, and focuses on challenges such as inadequate professional development, curriculum implementation difficulties and poor infrastructure rather than technology adoption [13].

3.3 Context and Motivation for this Study

This study took place in Botswana, a Southern African country, where students take an introductory computer awareness course in Junior Secondary School and then may electively choose computer studies in Senior Secondary School [28]. In the primary school, students have less access to digital devices such as laptops than in secondary schools [28]. Additional CS activities are delivered via outreach programs and extra-curricular activities [25]. Although AI

topics have not yet been included in formal curricula, recent work has shown that almost all students are using AI in their school studies [8]. However, the extent to which teachers are using AI tools in their professional practice is unknown.

Our study contributes to the growing body of AI education research in Africa by presenting the first mixed-methods study in Botswana into K-12 teachers' motivation to learn about and use AI/ML in education. In the Botswana context, the term K–12 refers to primary and secondary schools. While prior African research has largely focused on behavioral intentions, our mixed-methods approach, combining an adapted MTCS scale [16] with open-ended responses, provides a nuanced understanding through the lens of SDT [20] of the intrinsic and extrinsic factors shaping teacher motivation.

4 Method

This mixed-methods study used a survey combining quantitative and qualitative items to investigate teachers' motivations to engage with AI and ML in education.

4.1 Participants

Teachers were recruited in collaboration with the Ministry of Education and CSEdBotswana, a national initiative that organizes annual one-day coding events in schools across Botswana [26]. As part of this program, participating teachers were voluntarily invited by the Ministry via email to attend a two-hour online introductory training on AI and ML, with the goal of teaching these concepts to their students during the event. The survey was administered a week before the training, enabling us to capture teachers' baseline motivations and uses of AI prior to any formal exposure to AI/ML content.

A total of 59 teachers responded to the Motivation to Teach Computer Science (MTCS) Scale [16]. Participants varied in their years of teaching experience, where 1 participant (1.7%) reported having less than 1 year of experience, 12 (20.3%) had between 1 and 5 years of experience, 11 (18.6%) had between 6 and 10 years, and 35 (59.3%) had 10 or more years of experience. Regarding educational attainment (highest degree), participants also reported a range of academic qualifications: 26 (44.1%) held a bachelor's degree, 7 (11.9%) held a master's degree, and 25 (42.4%) reported holding another type of diploma (e.g., High School). Teachers also reported working across different educational levels, where 18 (30.5%) taught at the primary school level (students aged 6–13 years), 30 (50.8%) at the junior secondary level (students aged 13–15 years), and 11 (18.6%) at the senior secondary level (students aged 15–18 years). Thirty six participants (61%) reported teaching in a rural school, and 23 (39%) in an urban school. Finally, the participating respondents taught a range of subjects, including mathematics, general science, art and design, computer studies, and computer awareness.

4.2 Data Collection and Analysis

4.2.1 ***The MTCS Scale****:* To measure teachers' motivations to learn about AI/ML in education, we administered an adapted version of the Motivation to Teach Computer Science (MTCS) Scale [16]. The MTCS is a validated, 18-item instrument designed to assess four dimensions of teacher motivation: External Pressure, External Benefit, Student Benefit, and Personal Enjoyment. Participants rated how true each statement was on a four-point Likert scale: Not at all true (1) to Definitely true (4). Although originally designed for computer science education, we adapted the scale to align with our AI and ML focus while retaining the underlying motivational constructs, as seen in Table 1.

Participants completed the survey via Google Forms. For analysis, we assigned numeric values to each response on the Likert scale (1 = Not at all true to 4 = Definitely true) and calculated subscale scores for each participant by averaging their responses to the items within each motivational construct. These individual subscale scores were then aggregated across all participants to compute sample means for each of the four motivation types. Given the exploratory nature of the study and modest sample size, we used descriptive statistics to summarize the overall strength of each motivational construct within the sample.

4.2.2 ***Open-ended Questions****.* We included three open-ended questions in the same survey to gather deeper insights into teachers' motivations, uses, and concerns regarding AI and ML in education. The questions were 1) "Why do you want to learn and teach about Machine Learning and Artificial Intelligence (AI)?" 2) "Please share how you use AI and any thoughts you have about the role of AI and ML in education" 3) "Do you have concerns or challenges you see about adopting AI in education in Botswana?"

These questions were designed to complement the quantitative data by exploring teachers' motivations in their own words. Responses were analyzed using thematic analysis [6], using an inductive coding approach. The third researcher conducted an initial round of close reading and generated preliminary codes using Excel, identifying emerging themes directly from the data. These initial codes were iteratively grouped into broader thematic categories. To identify dominant patterns, the first and third researchers calculated the frequency of responses associated with each theme and selected illustrative quotes to represent common or compelling viewpoints. The resulting themes were then reviewed and validated by the first researcher, with some categories collapsed or refined where appropriate. Any disagreements were resolved through discussion to ensure reliability in the final coding structure.

4.3 Ethical Considerations

This study received approval from the Research Department at the Ministry of Education and Skills Development. Participation in the study was voluntary, and informed consent was obtained at the beginning of the online survey. No personal identifiers (such as names or school names) were collected, and all responses were fully anonymized prior to analysis. Data were stored securely and were only accessible to the research team for the purposes of this study.

5 Results

This section reports findings on teachers' motivations, AI use, and perceived affordances and challenges.

5.1 RQ1: Motivations-Quantitative

To understand what motivates teachers to teach and learn AI and ML, we used the MTCS Scale (See Table 1). Cronbach's alpha reliability analysis showed acceptable consistency for the *Student*

Table 1: Motivation to Teach and Learn about AI and ML: Survey Items by Construct

Construct	Survey Items
Student Benefit	It will help prepare my students for higher education. I want more traditionally underrepresented students to learn about ML and AI. I believe that ML and AI can open doors to economic independence or upward mobility for those I may teach (or train). It could help prepare those I teach for future jobs. It is important to me that all students have the opportunity to take ML and AI courses.
Personal Enjoyment	I think it will be satisfying to teach ML and AI. I think I will enjoy it. I love to learn new things. I think ML and AI will be interesting. I thought it would be fun to learn ML and AI skills and/or concepts.
External Benefit	It will help advance my career. It would benefit me financially. It will provide me with greater job security as an educator. It has more prestige than teaching other subjects.
External Pressure	My school (workplace) encouraged me. I feel pressured by others to teach ML and AI. My school (workplace) requires it. I feel pressurized by my school or workplace.

Benefits (α = .77) and *External Benefit* (α = .78) subscales, and moderate consistency for *Personal Enjoyment* (α = .65) and *External Pressure* (α = .66). These values are adequate for exploratory analysis but warrant cautious interpretation.

The *student benefit* construct yielded a mean score of 3.57, indicating a high level of agreement among participants that AI and ML education may positively impact student outcomes. Responses reflected strong agreement with items about the potential of AI/ML to promote academic advancement, career readiness, and social mobility, especially for traditionally underrepresented students.

The *personal enjoyment* subscale demonstrated the highest overall mean, at 3.71. Items such as *"I love to learn new things"* and *"I thought it would be fun to learn ML and AI skills and/or concepts"* were consistently rated highly.

The construct of *external benefit* produced a moderate mean score of 2.88, indicating a more ambivalent but present role of instrumental incentives in motivating teachers. While some participants acknowledged the potential for AI/ML instruction to enhance job security, career advancement, or professional prestige, these were not dominant motivators.

The *external pressure* sub-scale recorded the lowest mean score, at 2.22, indicating limited agreement with items reflecting institutional or interpersonal coercion (e.g., mandates from administrators, school requirements, or peer influence).

These findings indicate that personal enjoyment and perceived benefits for students are more motivational for K-12 teachers to learn about and use AI than external benefits and external pressure.

5.2 RQ1: Motivations-Qualitative

To complement the survey data and deepen our understanding of teacher motivations, we analyzed open-ended responses to the question, *"Why do you want to learn and teach AI and ML?"* Thematic analysis revealed six distinct motivational categories. First, many teachers expressed a desire to gain knowledge and enhance the skills associated with AI and ML (n=24). For instance, one teacher shared, *"I want to acquire knowledge on Machine Learning and Artificial Intelligence so I can provide solutions to problems."* The second most common motivation was to keep abreast with technological changes (n=12), reflecting a forward-looking mindset: *"Because we are living in the digital era, where online teaching and learning is key,"* one participant explained. Closely related was the motivation to be in a better position to guide students in the digitalization era (n=12).

Another theme that emerged was enhancing learning by incorporating AI and ML in teaching (n=9), with teachers highlighting practical applications: *"I want to apply them in my lessons,"* and *"It can help simplify maths and make it fun."* A smaller group of respondents showed a keen personal interest in technology (n=4). Finally, some teachers noted the potential of AI and ML to make difficult subjects easier to teach (n=5).

These findings suggest that teachers' motivations were shaped by a blend of professional commitment, pedagogical enhancement, and personal interest. These themes generally align with the motivational constructs measured quantitatively and provide richer insight into how teachers frame their personal and professional reasons for engaging with AI.

5.3 RQ2: Teachers' current use of AI tools

RQ2 asked how teachers currently use AI in their educational practice. We analyzed both the frequency of use reported by teachers across demographic groups and specific applications of AI in teaching. We asked participants the question: *"How often do you use AI in your teaching or educational activities?"* Respondents selected from a predefined list of frequency categories.

For analysis, we consolidated these responses into three broader categories: Never, Infrequent Use, and Frequent Use, where the "Infrequent Use group" included teachers who selected: A couple of

times a year, Once a month, or Every couple of weeks, indicating little or irregular use of AI and the"Frequent Use group" included those who selected: Several times a month, Once a week, or Several times a week, indicating more routine integration of AI into their educational practice.

Table 2: Frequency of AI Use in Teaching by Demographics

Group	n	Never	Infrequent	Frequent
All Teachers	59	35.6%	27.1%	37.3%
By Location				
Rural	36	33.3%	30.6%	36.1%
Urban	23	39.1%	21.7%	39.1%
By Teaching Experience				
Less than 10 years	24	41.7%	29.2%	33.3%
More than 10 years	36	30.6%	27.8%	38.9%
By School Level				
Primary School	18	66.7%	16.7%	16.7%
Junior Secondary	30	20.0%	36.7%	43.3%
Senior Secondary	11	27.3%	18.2%	54.6%
By Subject Area				
Computing Teachers	19	5.3%	36.8%	57.9%
Non-Computing Teachers	40	50.0%	22.5%	27.5%

Table 2 shows that 64.4% of participants reported infrequent or frequent use of AI in their teaching or educational activities. Notably, the patterns between rural and urban teachers are relatively similar: 36.1% of rural teachers and 39.1% of urban teachers reported frequent use. However, larger differences emerge across other demographic groups. Teachers at the senior secondary school level reported the highest rate of frequent AI use (54.6%), followed closely by junior secondary teachers (43.3%). In contrast, only 16.7% of primary school teachers reported frequent AI use, with two-thirds indicating they never use it. Similarly, computing teachers stood out as the most frequent adopters of AI: 57.9% use it regularly, and only 5.3% reported never using it. Conversely, among non-computing teachers, just 27.5% reported frequent use, and half said they never use AI. These results suggest that subject matter and teaching level play a substantial role in shaping how AI is perceived and integrated into classroom practice.

Among the teachers (64.4%) of 59, who reported using AI in their teaching, 63% use it to create lesson plans or instructional materials, while 58% use it to develop or answer classroom discussion questions and assignments. Additionally, 29% reported using AI to edit student work, such as improving grammar, clarity, or syntax.

5.4 RQ3: Teachers' perceived Affordances and Challenges of AI tools

To explore teachers' perceptions of the benefits and challenges of AI in education (RQ3), we firstly examined their responses to an open-ended question about AI's usefulness. Six main themes emerged. The most prominent theme, Enhancing digital literacy and learning (n=14), highlights teachers' belief that AI can serve as a powerful tool to improve educational quality. One teacher remarked, *"AI comes at the right time where resources such as books are scarce… it fills in these gaps so we can focus on improving lessons and results."* Closely related was Transforming the education system to world standard (n=13), where participants envisioned AI as a catalyst for aligning Botswana's educational practices with global standards: *"It will transform our education landscape and keep us abreast with developed nations."* Assistance for quality research and writing was cited by participants (n=11) reflecting appreciation for AI's role in supporting academic work. Meanwhile, Making learning easy and fun (n=10) reflected teachers' hopes for AI to improve student engagement and motivation. As one teacher stated, *"It will definitely revolutionize the way we do teaching and learning, making students more proactive."* Smaller themes included Helping teachers keep up with emerging technologies (n=5) and Creating business opportunities (n=2).

In response to an open-ended question about concerns or challenges with adopting AI in education, teachers highlighted six key themes. When asked about concerns with adopting AI in education, teachers highlighted six themes. The most frequent was *"No concern"* (21 responses), suggesting general optimism, though this may also reflect limited familiarity or engagement with AI's potential challenges. However, infrastructural limitations were prominent, with 15 teachers citing a lack of learning gadgets and resources, including laptops and computer labs and 14 highlighting poor or unreliable internet connectivity. One teacher noted, *"We lack resources like laptops and internet for students."* Fewer participants raised concerns about teacher preparedness, with two mentioning a lack of AI-related skills. Additionally, six teachers expressed fears that AI might encourage laziness or overdependence among students, warning that *"students might rely on AI to do their work rather than using it to enhance their learning."* Finally, two teachers raised the sensitive issue of potential job loss.

6 Discussion

In this study, we sought to better understand motivational drivers for teachers in Botswana to learn about and use AI in the classroom. Results from the adapted MTCS survey [16] showed that teachers were more likely to be motivated by personal enjoyment and student benefit than external benefit or external pressure. Qualitative data revealed both personal and contextual motivators which present opportunities and challenges for the adoption of AI in the classroom. The findings regarding teachers' motivations to engage with AI are interpreted here through Self-Determination Theory's continuum of motivation types [20].

6.1 Intrinsic motivational factors

The results show evidence of *intrinsic motivation* among participating teachers, who appeared motivated by the learning about AI, experimenting with novel teaching approaches, and keeping up-to-date with new technology. Their motivation stemmed from the activity itself rather than any separable outcome, representing the most internalized of self-determined behavior [16]. This intrinsic engagement was evident among teachers who described AI exploration as personally fulfilling and professionally energizing, suggesting that the technology satisfied their basic psychological needs for competence (mastering new skills), autonomy (choosing how to integrate AI), and relatedness (connecting with students through innovative approaches). While these results may not be generalizable to the whole teacher population due to the sampling

method used, our findings reinforce earlier work about teachers' intrinsic motivations [2, 29] and extend this evidence base to the African context.

6.2 Extrinsic motivational factors

Our findings show that teachers were also motivated by extrinsic factors. We present these here, beginning with the most autonomous, internalized regulatory style and then moving left along the continuum to the least autonomous style (see Figure 1).

One of our most striking findings was that some teachers were motivated by a desire to transform the education system to world standard. This type of *integrated regulation* motivation is the most autonomous form of extrinsic motivation in SDT. Such teachers appear to have incorporated educational transformation into their professional identity, seeing themselves as agents of systemic change rather than simply classroom instructors [7]. This integration of values with identity suggests deep internalization that encompasses a comprehensive vision of their role in educational advancement. This finding aligns with Giroux's conceptualization of teachers as transformative intellectuals, who move beyond classroom management to engage in critical reflection about their role in broader social and educational transformation [12].

Teachers' expressed desires to enhance learning, guide students, make learning engaging, and help students with difficult subjects represents *identified regulation*, a form of autonomous extrinsic motivation where educators have consciously endorsed these pedagogical values [20]. These teachers have internalized the importance of student engagement and effective instruction and view AI as a tool that aligns with their personal teaching goals. Teachers' responses about the external benefits of AI and ML represent *introjected regulation*. Although the mean of survey responses was lower than personal enjoyment and student benefit, when compared with responses from teachers in England (1.97) [29], it was noticeably higher (2.88), suggesting that in a low-resourced country, incentives such as job security, career advancement and prestige are important[3, 18].

However, the study also revealed motivations that fall toward the lowest end of SDT's autonomy continuum. Teachers concerned about infrastructure and equipment availability exhibited *external regulation*. This is the least autonomous form of motivation where behavior is contingent on avoiding external threats and aligns with previous findings from African teachers [13]. The challenges persist in Botswana [27]. Unless these infrastructure factors are addressed, we suggest that teachers may become *amotivated* to learn about and use AI in the classroom.

6.3 Current use of AI Tools

While we found AI-use in formal teaching is an emerging topic in Botswana, 73% of teacher participants are already capitalizing on it personally or professionally. This supports our RQ1 finding that *intrinsic motivation* is a key driver of engagement [10]. Some uses also reflect *identified regulation*, particularly teachers using AI for lesson planning and instructional support. This aligns with Jatileni et al. [14] findings that perceived relevance can positively influence teachers' motivation to integrate AI in the classroom. *External regulation* in SDT highlights the important role that external contexts play in motivation. In Botswana, most secondary schools (urban and rural) have access to internet and computer labs, which helps explain the similar rates of AI use across geographic regions [28]. In contrast, lower use among primary teachers reflects infrastructure gaps, as primary schools are not equipped with comparable resources [28]. Together, these results suggest that teachers' use of AI is not just about intrinsic motivation, but is deeply shaped by extrinsic factors such as sociocultural context, subject expectations, school level, peer norms, and national digital goals.

6.4 Limitations

This study has several limitations that should be considered when interpreting the findings. The presented results rely on self-reported data from teachers, which may be subject to social desirability bias or inaccuracies in participants' understanding. Terminology related to AI and ML can be interpreted differently by individuals depending on their prior exposure and knowledge. Despite efforts to provide clear definitions in the survey, variability in understanding may have influenced how participants responded to some items. In addition, the sample may not be fully representative of all teachers in Botswana. Participation in the study was voluntary, and those who chose to complete the survey may already have a stronger interest in technology than the broader teaching population. The results might reflect a more tech-engaged subgroup, limiting the generalizability of the findings. Finally, the study's cross-sectional design captures teachers' motivations and perceptions at a single point in time. Motivation to engage with emerging technologies like AI may fluctuate over time, particularly as new tools become available. Longitudinal research would be valuable to track changes in motivation. Despite these limitations, this study offers useful initial insights into teachers' motivations to engage with AI and ML and highlights important areas for future research and support.

7 Conclusion and Implications

This study examined what motivates K-12 teachers in Botswana to engage with AI and ML, revealing that intrinsic enjoyment and perceived student benefit are central drivers, supported by values-aligned extrinsic motivations such as a desire to improve education. While enthusiasm was high, actual AI and ML educational use varied due to infrastructural and contextual constraints, suggesting that motivation must be matched with opportunity. These findings have implications for both practice and policy. Outreach activities in AI and ML education, delivered in partnership with Departments of Education, may harness existing teacher motivation and translate it into action while formal systems and curricula continue to develop. For policy makers, improving infrastructure and professional development in line with teachers' existing values is critical to fostering sustainable engagement. For CS education researchers, the results highlight the need to study how motivation interacts with contextual barriers and to design interventions that amplify both intrinsic and extrinsic engagement in low-resource settings.

References

[1] Ángel Abós, Javier Sevil, José Martín-Albo, Alberto Aibar, and Luis García-González. 2018. Validation evidence of the motivation for teaching scale in secondary education. *The Spanish Journal of Psychology* 21 (2018), E9.

[2] Salomey Afua Addo and Sue Sentance. 2023. Teachers' Motivation for Teaching AI in K-12 settings. In *Proceedings of the 2023 Conference on Human Centered Artificial Intelligence: Education and Practice*. 43–43.

[3] LI Akunne, VN Nwadinobi, OB Mokwelu, and SC Ezeokafor. 2023. The relationship between teacher's motivation and their job satisfaction in secondary schools in onitsh education zone, anambra state, nigeria. *Asian Journal of Education and Social Studies* 42, 1 (2023), 31–38.

[4] Musa Adekunle Ayanwale, Ismaila Temitayo Sanusi, Owolabi Paul Adelana, Kehinde D Aruleba, and Solomon Sunday Oyelere. 2022. Teachers' readiness and intention to teach artificial intelligence in schools. *Computers and Education: Artificial Intelligence* 3 (2022), 100099.

[5] Kelly D Bradley and William E Loadman. 2005. Urban secondary educators' views of teacher recruitment and retention. *NASSP Bulletin* 89, 644 (2005), 2–28.

[6] Virginia Braun and Victoria Clarke. 2012. Thematic analysis. American Psychological Association. *APA handbook of research methods in psychology* 2 (2012), 71.

[7] Chris Brown, Robert White, and Anthony Kelly. 2023. Teachers as educational change agents: What do we currently know? Findings from a systematic review. *Emerald Open Research* 1, 3 (2023).

[8] Katharine Childs, Ethel Tshukudu, Gaokgakala Alogeng, Douglas Case, Tebogo Videlmah Molebatsi, and Emma R Dodoo. 2025. Secondary Students' Conceptions of AI in an African Country. In *Proceedings of the ACM Global on Computing Education Conference 2025 Vol 2*. 383–384.

[9] Edward L Deci and Richard M Ryan. 1985. The general causality orientations scale: Self-determination in personality. *Journal of research in personality* 19, 2 (1985), 109–134.

[10] Edward L Deci and Richard M Ryan. 2012. Self-determination theory. *Handbook of theories of social psychology* 1, 20 (2012), 416–436.

[11] Maxwell Fundi, Ismaila Temitayo Sanusi, Solomon Sunday Oyelere, and Mildred Ayere. 2024. Advancing AI education: Assessing Kenyan in-service teachers' preparedness for integrating artificial intelligence in competence-based curriculum. *Computers in Human Behavior Reports* 14 (2024), 100412.

[12] Henry A Giroux. 1988. *Teachers as intellectuals: Toward a critical pedagogy of learning*. Bloomsbury Publishing.

[13] Cheryl Hunter and Tsooane Molapo. 2014. Current challenges and future trends for teacher training in Southern Africa: a focused look at Botswana and Lesotho. *Annual Review of Comparative and International Education 2014* (2014), 295–328.

[14] Cloneria Nyambali Jatileni, Ismaila Temitayo Sanusi, Sunday Adewale Olaleye, Musa Adekunle Ayanwale, Friday Joseph Agbo, and Peter B Oyelere. 2024. Artificial intelligence in compulsory level of education: Perspectives from Namibian in-service teachers. *Education and information technologies* 29, 10 (2024), 12569–12596.

[15] Lívia S Marques, Christiane Gresse von Wangenheim, and Jean CR Hauck. 2020. Teaching machine learning in school: A systematic mapping of the state of the art. *Informatics in Education* 19, 2 (2020), 283–321.

[16] Nicole D Martin, Stephanie N Baker, Madeline Haynes, and Jayce R Warner. 2021. Development and Validation of the Motivation to Teach Computer Science Scale. In *Proceedings of the 52nd ACM Technical Symposium on Computer Science Education*. 1312–1312.

[17] Craig A Mertler. 2002. Job satisfaction and perception of motivation among middle and high school teachers. *American secondary education* (2002), 43–53.

[18] Dr. Christina Elisante Mnjokava. 2025. Motivation and Job Satisfaction among Primary School Teachers in Rural Mbulu District in Manyara Region, Tanzania. *International Journal of Innovative Research and Development* (2025). https://api.semanticscholar.org/CorpusID:276775285

[19] Richard M Ryan and Edward L Deci. 2000. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American psychologist* 55, 1 (2000), 68.

[20] Richard M. Ryan and Edward L. Deci. 2020. Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology* 61 (2020), 101860. https://doi.org/10.1016/j.cedpsych.2020.101860

[21] Ismaila Temitayo Sanusi, Solomon Sunday Oyelere, and Joseph Olamide Omidiora. 2022. Exploring teachers' preconceptions of teaching machine learning in high school: A preliminary insight from Africa. *Computers and Education Open* 3 (2022), 100072.

[22] Ismaila Temitayo Sanusi, Solomon Sunday Oyelere, Henriikka Vartiainen, Jarkko Suhonen, and Markku Tukiainen. 2023. Developing middle school students' understanding of machine learning in an African school. *Computers and Education: Artificial Intelligence* 5 (2023), 100155.

[23] Mohsen Soori, Behrooz Arezoo, and Roza Dastres. 2023. Artificial intelligence, machine learning and deep learning in advanced robotics, a review. *Cognitive Robotics* 3 (2023), 54–70.

[24] Matti Tedre, Tapani Toivonen, Juho Kahila, Henriikka Vartiainen, Teemu Valtonen, Ilkka Jormanainen, and Arnold Pears. 2021. Teaching machine learning in K–12 classroom: Pedagogical and technological trajectories for artificial intelligence education. *IEEE access* 9 (2021), 110558–110572.

[25] Ethel Tshukudu, Maria Kallia, Katharine Childs, and William Darragh. 2023. Broadening Participation in Computing: Experiences of the Hour of Code in an African Country. In *Proceedings of the 18th WiPSCE Conference on Primary and Secondary Computing Education Research* (Cambridge, United Kingdom) *(WiPSCE '23)*. Association for Computing Machinery, New York, NY, USA, Article 18, 4 pages. https://doi.org/10.1145/3605468.3605502

[26] Ethel Tshukudu, Alan Peterfreund, Shanah Suping, Sue Sentance, and Quintin Cutts. 2025. Growing a National Computing Movement in an African Country: A Multi-Stakeholder Model. In *Proceedings of the ACM Global on Computing Education Conference 2025 Vol 2*. 407–408.

[27] Ethel Tshukudu, Keoikantse Sehuhula, Shain Vyomakesan, and Boitshwarelo Palamelo. 2025. Evolving Capacity for Computing Education in Botswana: A Comparative Look at 2021 and 2025 Teacher Perspectives. In *Proceedings of the ACM Global on Computing Education Conference 2025 Vol 2*. 398–399.

[28] Ethel Tshukudu, Sue Sentance, Oluwatoyin Adelakun-Adeyemo, Brenda Nyaringita, Keith Quille, and Ziling Zhong. 2023. Investigating K-12 Computing Education in Four African Countries (Botswana, Kenya, Nigeria, and Uganda). *ACM Trans. Comput. Educ.* 23, 1, Article 9 (Jan. 2023), 29 pages. https://doi.org/10.1145/3554924

[29] Ethel Tshukudu, Jane Waite, Saman Rizvi, and Sue Sentance. 2022. Teachers' Motivations to Learn about ML and AI. In *Proceedings of the 27th ACM Conference on on Innovation and Technology in Computer Science Education Vol. 2* (Dublin, Ireland) *(ITiCSE '22)*. Association for Computing Machinery, New York, NY, USA, 609. https://doi.org/10.1145/3502717.3532148