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Playwriting as an emergent pedagogical tool for primary school student teachers

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Background: This research explored how classroom plays could serve as pedagogical tools to introduce children to Sesotho and isiZulu vocabulary of artificial intelligence (AI). The article captures how student teachers learned to write plays that they could produce when they become professional teachers.

Objectives: The purpose of this study was to explore how student teachers engaged in a playwriting process, creating drama texts for early grades primary school learners about AI.

Method: The qualitative study employed, a participatory action research design. Data were collected through semi-structured interviews with the student teachers, coupled with a dual analysis of their drama texts. An inductive thematic analysis approach was applied for the data from interviews with the students. A deductive approach was implemented to analyse the drama texts according to criteria for playwriting with a pedagogical purpose.

Results: The findings revealed that playwriting as a tool for pedagogy can be useful in developing student teachers' vocabulary of AI in Sesotho or isiZulu and to develop their playwriting skills.

Conclusion: The findings contribute to the corpus of pedagogies for the teaching of vocabulary in African languages, which includes writing the texts and aiming to use these for reading experience and for dramatic activity in early grades classrooms.

Contribution: The contribution of this study is how playwriting can serve as a pedagogical tool for the teaching of reading and vocabulary in the primary school.

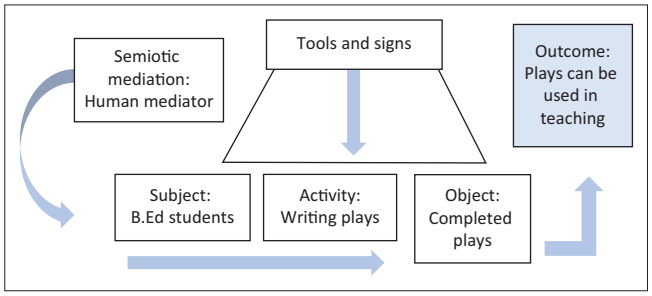
Keywords: playwriting; vocabulary; Sesotho; isiZulu; early grades; reading; artificial intelligence; remote learning.

Introduction: Reading as gateway to learning

The preparation of student teachers for literacy education is a key component of teacher education programmes (Moodley & Aronstam 2016; Pretorius & Murray 2019; Reed 2014; Taylor 2019). It is particularly important for teaching reading in the African languages, in which most children in South Africa learn to read and write. Much of the available global literature about reading pedagogy is about the teaching of reading in English, with some exceptions in South Africa, for example the studies of Pretorius and Klapwijk (2016), Simelane (2023), Spaull and Hoadley (2017), Spaull and Pretorius (2019), Spaull, Pretorius and Mohohlwane (2020), and Taylor (2019). A key aspect of learning to read is children's knowledge of the vocabulary and the syntax and grammatical structures of the language in which they learn to read (Ehri 2005; Moghadam, Zainal & Ghaderpour 2012). Ehri (2020:546) notes that 'to bond spellings to syntactic and semantic identities, readers have to read words in contexts where syntactic and semantic identities are activated when the spellings are seen'. This means that the meaning of words and their arrangement in sentences are important for initial reading, as well as when children learn how to spell words and to get to know the orthography of a language. In teacher education programmes, phonological, and phonemic awareness are usually emphasised, but the teaching of vocabulary and language structures are somewhat neglected. Simelane (2023) recently found that teachers pay scant attention to the semantics of the language when teaching decoding in isiZulu. This issue is often perpetuated by inadequate training of student teachers in initial teacher education programmes (Henning & Simelane 2023). The blame for poor results of South African learners' reading is regularly laid at the door of initial teacher education (ITE) (Reed 2014). In the current study, we proposed that one way of addressing teacher preparation for reading is to introduce playwriting as a gateway to student teachers' understanding of the power of reading and how it can be coupled with a pedagogy of scripted dramatic play (Henning 1981, 1991).

This type of pedagogy could be initiated by introducing students in ITE programmes through playwriting tasks as part of their preparation to teach literacy, specifically in African languages. Gardiner (2019), a theorist of playwriting, suggests that immersing students in playwriting activities adds practical value to the theory that they study about what constitutes dramatic action and dialogue. We would agree that playwriting could guide student teachers in how to infuse literacy skills and concepts in drama texts. Additionally, playwriting tasks can develop student teachers' knowledge about drama as a pedagogy in general (Üstündağ 1997; Worthman 2002). According to Gardiner and Anderson (2018), playwriting is a useful method for teaching students about and through drama. Such a pedagogy can address some of the criticisms about initial teacher education being too theoretical – at the expense of developing practical learning (Darling-Hammond 2006, 2023; Gravett & Ramsaroop 2015; Korthagen 2004).

In initial teacher education programmes in South Africa there is no research about the use of scripted dramatic play for teaching of literacy in the African languages. Moreover, apart from improvised dialogues in 'learning through play' (Isaacs et al. 2019; Lunga, Esterhuizen & Koen 2022; Ndabezitha & Gravett 2023), there is very little research about the teaching of vocabulary in local languages through scripted plays. We propose that playwriting and classroom play production differ from the dominant 'learning though play' educational paradigm and that it can be a useful tool for introducing children to a phenomenon (and its vocabulary and discourse) that they may not have encountered before (Baines & Dial 1995). Moreover, scripted plays require engagement with written language and can add to experiences of literacy. In this study, the first author, M.N.K., explored how specific artificial intelligence (AI) vocabulary, and playwriting in general, can be introduced to student teachers in Sesotho and isiZulu. To do so, she drew on Vygotsky's cultural-historical theory (Engeström 1987, 2015) (Figure 1), also known as 'sociocultural theory' (Kozulin 1990, 2003), in which *semiotic mediation* happens through tools and signs. Scaffolding such tools and signs is the work of the 'human mediator', or the mediating agent (Kozulin 2003:19). For the current study, the *tools and signs* were the dialogue in the plays and the student teachers were the 'subjects' of the *activity* of playwriting towards creating scripts that could be used in classroom practice in the early grades. The lecturer was the human *mediator* who supported the students and who taught them the skills of playwriting through scaffolding their learning within their combined 'zone of proximal development' (Chaiklin 2003; Hedegaard 2012).



Source: Adapted from Engeström, Y., 1987, 'The emergence of learning activity as a historical form of human learning', in Y. Engeström (ed), *Learning by expanding: An activity-theoretical approach to developmental research*, pp. 29–127. Cambridge University Press, Helsinki; Engeström, Y., 2001, 'Making expansive decisions: An activity-theoretical study of practitioners building collaborative medical care for children', in C.M Allwood & M Selart (eds.), *Decision making: Social and creative dimensions*, pp. 281–301. Springer Dordrecht, Berlin

FIGURE 1: Semiotic mediation for playwriting.

In this theory, Vygotsky (1978), as discussed by Engeström (2015) and by Kozulin (1990, 1998, 2003), proposed that tools and signs are semiotic mediators of the *activity* of learning and that language is such a primary tool, used by the human mediator to assist students in their learning. In the present study, student teachers used their knowledge of languages to compose the content of their plays. A core aspect of sociocultural and culturalihistorical and activity theory (CHAT – the current term for activity theory in the Vygotskian tradition, according to Engeström 1987, 2001, 2015) is the principle of a *semiotic mediation* of an acting *subject*'s engagement in an activity towards an *object*. If the object is attained, it would follow that there will be observable *outcomes*. In this view, the students' playwriting *activity*, if achieved, would have an observable outcome. Such an outcome would be, for example, that they wrote plays that could be used as pedagogical tools in their future teaching careers.

Ultimately, children could thus learn through dramatic play from drama scripts provided by their teachers, with content and vocabulary that are drawn from the curriculum (Scharer 2022). In this way, children not only learn vocabulary and discourse of a content area, but they also get additional literacy practice by reading and memorising the dialogue (Leung 2008; Scharer 2022) for the classroom performance. Scripted dialogue does not only mean mimicking the new words, but also enacting a character through dramatic action and dialogue, which can assist in remembering the words and contemplating their meaning. Teaching children new vocabulary has been shown to be effective for reading development as reported in studies by Alber and Foil (2003), Alshraideh and Alahmadi (2020), and Davies (1990). There are also studies that show how dramatic play can advance learning (Fernandez & Kullu 2019). The term, 'dramatic play', which implies the use of a dramatic script, is distinguished from the various forms of 'learning through play' (Isaacs et al. 2019; Lunga et al. 2018; Ndabezitha 2023). The dialogue and the scene setting of classroom plays are directed towards a specific educational outcome – such as introducing new vocabulary that is spoken and that is also read by participants. The script that is read and enacted does, however, fit into the general view of what is known as 'drama in education' (Dawson & Lee 2018; Dunn & O'Toole 2009; Idogho 2016).

Expanding vocabulary through classroom plays

'Drama in education' generally refers to the use of drama texts and dramatic performance techniques to support

learning in the classroom (Anderson 2012; Henning 1981, 1991). The term *drama in education* is synonymous with several other terms and can be used interchangeably with terms used in the literature, such as *developmental drama* (Caldwell-Cook 1917), *creative dramatics* (Ward 1930), *educational drama* (Way 1967), *mantle of the expert* (Bolton 1985; Heath 1993; Heathcote & Herbert 1985), *informal drama* (Wagner 1998) and *process drama* (Kao & O'Neill 1998). All these terms describe the use of drama techniques in the classroom for pedagogical purposes.

It is not precisely the same as the generic concept of 'learning though play' which is typically used along the broad characteristics as set out by the Lego Foundation[1] and studied and promoted by the Play in Education for Development and Learning (PEDAL) in the Faculty of Education at Cambridge University.[2] Apart from using drama texts, drama as improvisation, without scripts, takes place when a teacher scaffolds learners' improvised roles in an imagined context (Heathcote & Bolton 1995; Sawyer 1997). By doing so, the teacher acts as a mediator during improvised dramatic roles of the learners in what is generally described as role play. It indicates taking on an imaginary role that is situated in a specific pedagogic context (Heathcote 2009). According to authors who propose drama as a pedagogical tool (Brown 2017; Gupta 2009; Heathcote 2009), this methodology can enable children to learn from the choices and decisions they make during the improvisation (Anderson 2012; Bolton 1985; Sawyer 1997; Slade 1998; Way 1967). The improvisation would be facilitated by the teacher, who builds on the actions and reactions of the learners, while learners are enacting a particular role. Role play is a specific pedagogy that accentuates the character a learner portrays. Jarrett (1997) reports on how role play is applied as a teaching genre for science teaching. Fuji and Sugimura (2023:1) accentuate child development through role play. The authors 'hypothesized that both the frequency of role-play and the frequency of self-regulatory behaviour during role-play will be correlated with self-regulation in preschool classrooms'. Their data showed that the self-regulation of the pre-schoolers were developed 'in role' and were evident in every activity in the classrooms.

'Process drama', such as has been described so far, and which is not script-based, differs from children's theatre, because theatre takes form from scripted dialogue that is performed on a 'stage' – for an audience (Gray, Pascoe & Wright 2018; Pascoe 2014). In contrast, in the type of scripted play that is the topic of the present research, the teacher's role as a mediator comes in the form of being the director and the producer of the classroom play; during 'process drama' the teacher and the learners participate in improvised role play.

In the study reported in this article, the activity leans towards scripted children's classroom theatre in which the teacher is both *dramaturg* and *pedagogue*. The teacher creates plays and teaches. We would argue that using scripted plays can be useful for infusing targeted vocabulary in plays in which a teacher may want to introduce learners to specific content (Baldwin & Fleming 2003) and learn its related vocabulary and broader discourse. Such plays can be a powerful modality to enhance children's literacy as well (Aram & Mor 2009; Baker-Sennett, Matusov & Rogoff 1992; Baldwin & Fleming 2003). If composed with a specific objective, plays can engage children in a theatrical experience when they are the 'audience' as well as when they are the classroom 'actors' (Chizhik 2009). Whether as audience or as performers, children are, however, engaged in a process through which they can acquire vocabulary and have opportunities for practical expression of the acquired terminology (Baldwin & Fleming 2003; Pascoe 2014). The audience and the performers share in their theatrical experience, much as theatregoers and actors share the experience (Bennett 2005).

Thus, in terms of the topic of this research, we propose that, through scripted plays, children can learn to practise and develop the targeted 'academic' language of AI, which they will encounter not only in the curriculum of *digital skills* or *coding and robotics*, but which they will encounter in everyday life as well. In this way, the narrative of a play includes a familiar setting but also includes instructional dialogue that learners can practise (Purcell-Gates, Duke & Stouffer 2016). For instance, implementing drama techniques in language teaching affords teachers the opportunity to develop children's oral language skills (Di Pietro et al. 2008; Gray & Yang 2015; Samantaray 2014) as well as their literacy skills. In addition to oral language fluency, children are engaged in a text as readers too. In this way children can practise not only *reading* a text aloud accurately, at an appropriate speed, but doing so with the prosodic quality of spoken language (Pretorius & Murray 2019) when they are the actors. Their fellow classmates, as audience, can follow their spoken dialogue in print versions (Aram & Mor 2009; Leung 2008). This form of educational drama as classroom theatre has specific benefits, some of which are stimulating creative thinking, learning new vocabulary, and building their knowledge base.

Introducing children to artificial intelligence vocabulary through dramatic representation

John McCarthy first coined the term artificial intelligence (AI) in 1956 when he presented the idea at the first academic conference on the subject. He defined AI as the science of making machines intelligent, especially intelligent computer programs that could copy human intelligence (McCarthy 2007). Since the early days of AI, it has been situated in various disciplines (Li 2020; Prentzas 2013; Smith 2006), yet the understanding of its workings has remained elusive for many (Chiu & Chai 2020; Negishi 2019). Although the idea of introducing children to AI seems recent, it is not so recent and can be traced back to 1971, when Seymour Papert and Cynthia Solomon from MIT were pioneers in this field. They

1.(https://learningthroughplay.com/)

2.(https://www.educ.cam.ac.uk/centres/pedal)

introduced children to AI through 'LOGO Programming' and named the series *Turtle robot* (Papert & Solomon 1971). LOGO was the first computer language explicitly designed for children and was intended to support mathematics and make computer science simple and accessible to young learners. Although there have been attempts to introduce children to AI (Bennet 2017; Negishi 2019), there is still a need to do it in a way that appeals to children.

Marwala (2019) maintains that it is a field of knowledge that is accessible to children if they are introduced to it through stories. We propose that they can also learn about AI through dramatic play. In the stories and the illustrations in the books for preschool children, and those that are read to them, they can become acquainted with AI through the picture books in the dialogue with the reader. Storybooks written by Bezuidenhout (2021) are an example of how a storyline and drawings can not only capture children's attention, but also introduce basic concepts of AI (Figure 2). Buarque, Roberts and Marwala (2017) wrote the book series *My First A.I* that introduced children to the foundational concepts for AI and the Fourth Industrial Revolution (4IR).

Bezuidenhout (2021) has written children's books with an AI theme. The design of her books is based on the model of 'dialogue reading' books initiated by Purpura et al. (2017). The booklets are examples of the typical classroom library, and they have the potential of being converted to classroom plays. She introduces children to AI vocabulary.

Ethical considerations

Ethical clearance for this study was granted by the ethics and higher degrees committee in the Faculty of Education at the university where the study was conducted with the ethics number *Sem 2-2020-118*. Informed consent was requested and obtained from the participants who took part in this research. As a practitioner researcher, M.N.K. designed a course aimed at teaching students about playwriting as a pedagogical tool. It was important to ensure that the first author's dual role as both the researcher and their lecturer did not have a negative influence on the students and in the research process.

Source: Bezuidenhout, H.S., 2021, 'An early grade science, technology, engineering, and mathematics dialogue reading programme: The development of a conceptual framework', *South African Journal of Childhood Education* 11(1), 1–10. https://doi.org/10.4102/sajce.v11i1.1038

FIGURE 2: Alex the robot faces a dilemma.

Research methods

The study employed qualitative data collection methods including semi-structured focus group interviews and document analysis (Braun & Clark 2006; Henning, Van Rensburg & Smit 2004; Merriam 1998). The data analysis techniques included a deductive analysis of the classroom plays according to pedagogical – as well as dramaturgical – criteria for classroom plays, and an inductive analysis of the focus group interviews with the participants (Flick 2022; Kvale 1996; Lincoln & Guba 1985). Final year BEd student teachers in the Foundation Phase and Intermediate Phase programmes participated in the study. The data were gathered over two years, with the first set of data gathered from August 2020 to October 2020. The second set of data was gathered from August 2021 to October 2021. The data collection was structured in this way to allow student teachers six months to learn about pedagogical playwriting.

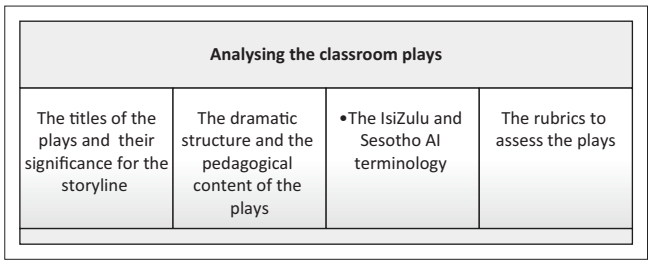
The population from which the sample was selected consisted of members of intact groups of students ($N = 445$). Participants were selected with a specific purpose in mind, utilising what is generally referred to as 'purposeful sampling' (Creswell 2003; Onwuegbuzie & Leech 2007; Strauss & Corbin 1990, 1998; Yin 2003). The sample ($n = 90$) was selected to include students who were conversant in Sesotho or isiZulu. The aim was to provide them with an opportunity to explore a novel way of teaching new vocabulary but also to highlight aspects of teaching reading and writing in the early grades. While the students were composing dialogue and scenes, they learned how learners may read the text and to write their own texts.

Analysis of the classroom plays

A deductive approach was employed to analyse the data from the classroom plays (Hyde 2000). The first author began the data analysis process by assessing the suitability of the titles of the plays. After that, she assessed the content of each play according to the criteria that had been sourced from the literature about educational plays for children. Following that, the Sesotho, and isiZulu AI vocabulary that the students had included in their plays were highlighted. Lastly, two rubrics were used to assess the overall pedagogical value of each play (Dunn & O'Toole 2009). The design of the rubric was informed by the literature on playwriting (Gardiner 2015, 2017, 2019; Gardiner & Anderson 2018). Figure 3 sets out the main components of the analysis process.

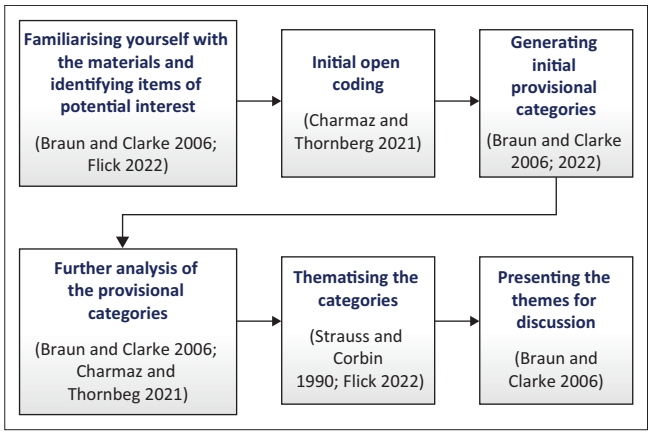
The analysis of the interviews

To analyse the interview data, the techniques of *thematic analysis* (Braun & Clark 2006, 2022) were applied. A key component of inductive data analysis is that the data are analysed in a 'bottom-up' process (Kvale 1996; Lincoln & Guba 1985). This approach of analysis is typical of grounded



AI, artificial intelligence.

FIGURE 3: Main components of the analysis process for the classroom plays.



Source: Adapted from Braun, V. & Clarke, V., 2006, 'Using thematic analysis in psychology', *Qualitative Research in Psychology* 3(2), 77–101. https://doi.org/10.1191/1478088706qp063oa; Braun, V. & Clarke, V., 2022, 'Conceptual and design thinking for thematic analysis', *Qualitative Psychology* 9(1), 3–26. https://doi.org/10.1037/qup0000196; Flick, U., 2022, *Doing interview research*, Sage, Los Angeles, CA; Strauss, A. & Corbin, J., 1990, *Qualitative research: Grounded theory*, Sage, New York, NY; Charmaz, K. & Thornberg, R., 2021, 'The pursuit of quality in grounded theory', *Qualitative Research in Psychology* 18(3), 305–327. https://doi.org/10.4135/9781446212165.n27

FIGURE 4: Reflexive thematic analysis process.

theory (Charmaz 2002, 2008; Strauss & Corbin 1990, 1998). The analysis conducted in this way does not necessarily produce a theory from the ground (the data) but serves only to, ultimately, organise codes, and categories in a thematic way. Typically, to begin with, after a thorough perusal of the data, codes are awarded to *units of meaning*, after which these codes are clustered in what is generally referred to as 'categories', also known as 'axial coding' (Strauss & Corbin 1990, 1998). In a subsequent step the categories were scrutinised to see if there were cross-cutting themes (Braun & Clarke 2006; Henning et al. 2004). Figure 4 shows the analysis process for the interviews.

The thematic analysis process was started by a thorough perusal of the data, including the notes made during the interviews and listening again to the recordings of the interviews. Flick's (2022) guidelines for rereading data were followed. It was also important to identify what could be noted as potential items of interest that usually appear as recurrent ideas shared by the participants (Braun & Clark 2022; Flick 2022). These items of interest are shown in Figure 5.

Initial open coding; Labelling the data sets for analysis

In thematic analysis, the process of initial coding comprises the labelling of the units of meaning in data sets

Items of interest in the data

1. Students found the playwriting process difficult
2. Writing a play about AI challenged their creativity
3. Teaching through drama can enhance children's oral language
4. Students saw the value of playwriting as a method for teaching
5. Drama was seen as valuable for enhancing children's language
6. Translating AI vocabulary was difficult.
7. Students appreciated the lecturers' guidance and feedback
8. Working in groups remotely was challenging but valuable.
9. Some studets would have preferred to work alone, rather than in groups
10. Students would have wanted to perform their plays
11. Translating required good knowledge of the language
12. Playwriting made students more aware of their own language proficiencies.
13. Respect for one another and sharing ideas were regarded as important values for maintaining good working relationships.
14. Listening to each other was regarded as important for working well together

AI, artificial intelligence.

FIGURE 5: Items of interest that were identified during the transcribing of the data.

(Thornberg & Charmaz 2014). This is done by a 'line by line coding' system, in which the identified units of meaning are assigned a label or code (Braun & Clarke 2006; Thornberg & Charmaz 2014). Phrases or sentences, or a selection of utterances that could be named or labelled, are identified in this way and awarded a short 'code' (Flick 2022; Henning et al. 2004; Henning, Van Rensburg & Smit 2011). In this process it was important to stay close to the words of the participants and to not misinterpret the meaning of responses that were given in Sesotho or isiZulu. The students' responses were translated to English. Table 1 shows an extract from a transcript that illustrates the process of how the data from the focus group interviews were transcribed and coded.

All the transcripts were coded in this way. The next phase of the data analysis was grouping codes into initial provisional categories (Braun & Clark 2006, 2022). Codes were clustered. Figure 6 is an example of a provisional category generated from the interview codes.

Further analysis of the provisional categories

A further analysis of the relationships between the provisional categories was aimed at generating refined categories that are detailed and specific (Thornberg & Charmaz 2014). The extracts of codes from the interview data were included to maintain the meaning of the category. Figure 7 is an example from the study that shows the analysis of the provisional categories to generate categories.

Thematising the categories

After identifying several substantive categories, it was important to refine these categories (Flick 2022). This was done by identifying patterns and classifying the substantive links or similarities between the categories (Corbin & Strauss 2007). In doing so, the relationships between the categories shown in Figure 8 were synthesised to generate the themes for the discussion (Braun & Clarke 2022).

TABLE 1: An extract from an interview transcript.

Line	Name of the play: *Ubuhlakane obenziwe esikhathini samanje* Extract from the transcript	Code (unit of meaning)
L1	**N**: Hello everyone and thank you for joining the session. I just want to find out, how was this process of creating a play in isiZulu and specifically about AI? How did you find that process?	
L2		
L3		
L4	**Student 1:** Can I speak Mam?	
L5	**N:** Yes, go ahead.	More difficult to use the correct isiZulu and easier use more colloquial language.
L6	**Student 1**: So, Mam the whole experience of designing a play in isiZulu about artificial intelligence. You know, it was a bit tricky because isiZulu *ngesinye isikhathi siyasigega* [at times we avoid using the correct isiZulu], *sibenzisa sa la eGoli* [we speak the isiZulu spoken in Gauteng]. The play required us *ukuthi sibhale isiZulu sangempela* [to write proper isiZulu].	Playwriting process required good command of the language.
L7		
L8		Some group members have good command of the language and there was good teamwork.
L8		
L9		Explaining AI concepts in proper isiZulu wasn't easy.
L10	So, thank God, most of my group members *kunalaba abaphuma eKZN* [are those from KZN], *nalaba abazi isiZulu sangempela* [those who know proper Zulu]. Like they really helped us because *besibambisene kahle* [we worked well together]. Like it wasn't easy, like mostly *ukuchaza ama concepts we artificial intelligence ngesiZulu esiqondile* [explaining artificial intelligence concepts in proper Zulu wasn't easy].	Thinking about making the AI vocabulary clear for children was a difficult process.
L11		
L12		Translating from English to isiZulu was difficult because of a lack of command of the language.
L13		
L14		
L15	So that *abantwana* [children] will understand and trying to lower the level of explaining for intermediate phase learners. Everything was a bit tricky, but we managed to pull through.	
L16		
L17	**N:** Thank you much for that. Anyone else that would like to share their response to the question?	
L18		
L19	**Student 2:** Uhmm yeah, personally for me I think it was the most challenging this that I have ever had to do because trying to translate English to isiZulu was hell (*giggles*). Because I don't have isiZulu background. I only started doing it here at the university.	
L20		
L21		
L22		

AI, artificial intelligence, KZN, KwaZulu-Natal.

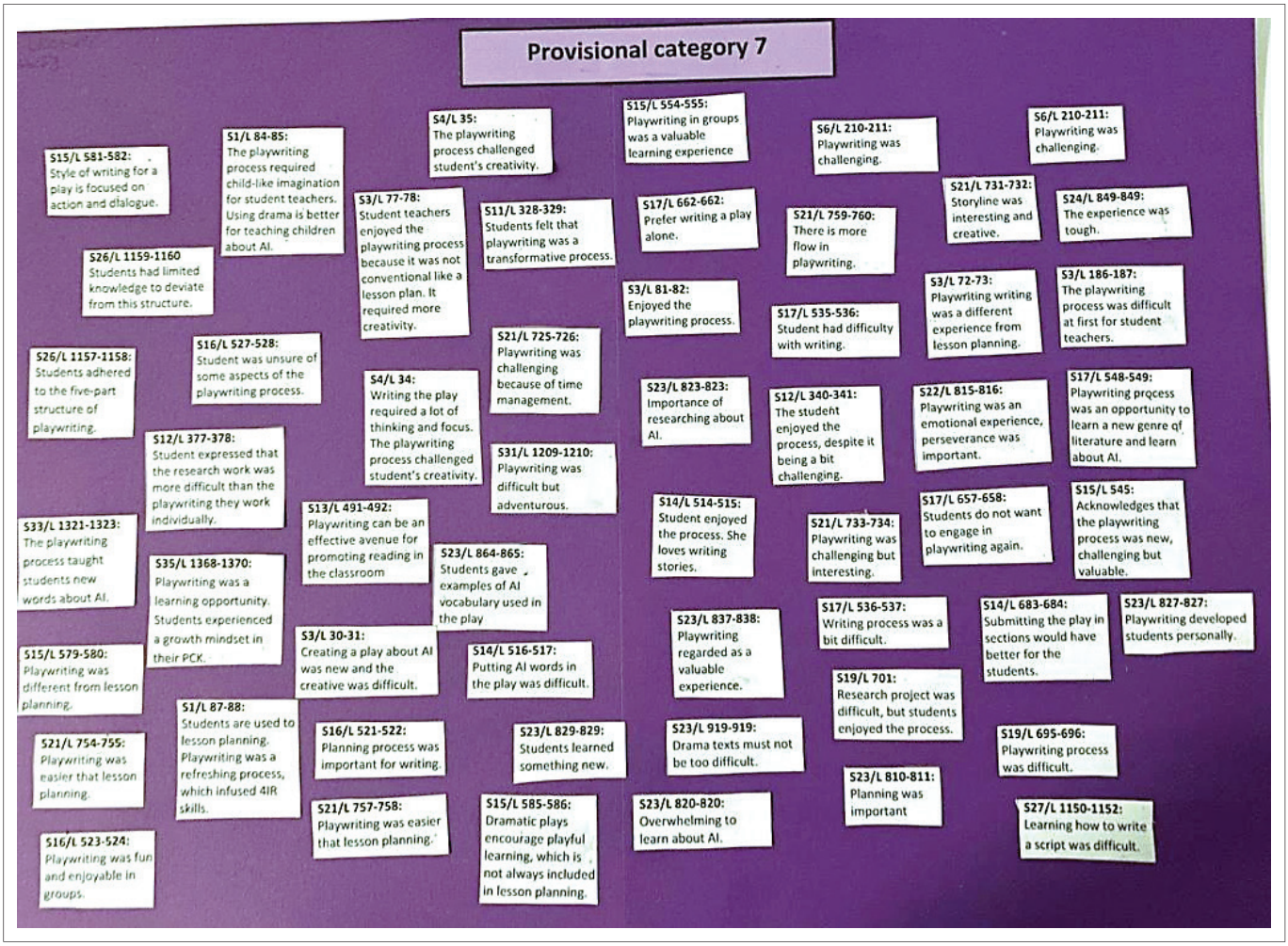
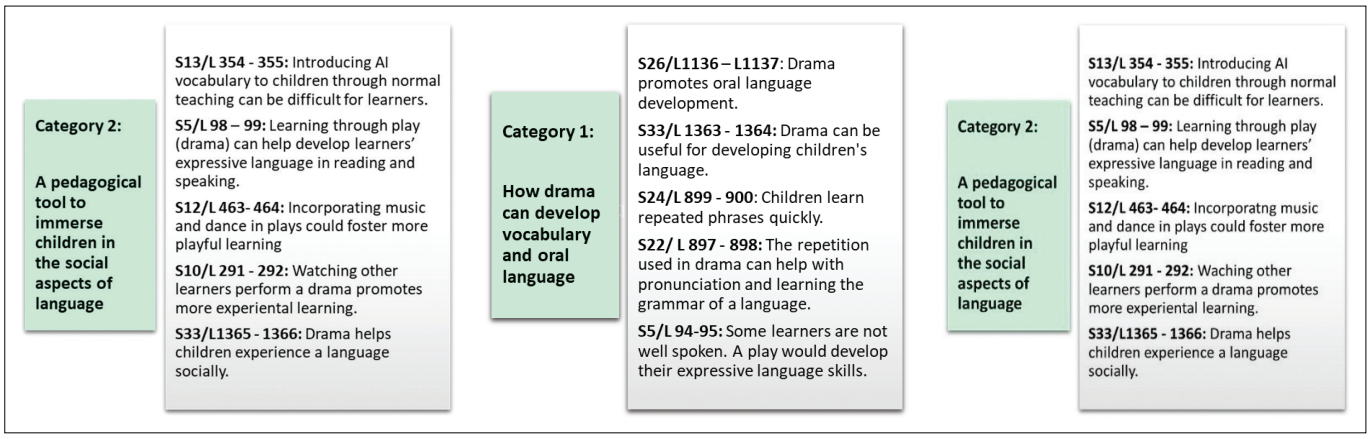


FIGURE 6: 'Provisional coding category' – Codes for 'Drama as a valuable pedagogical tool for learning'.

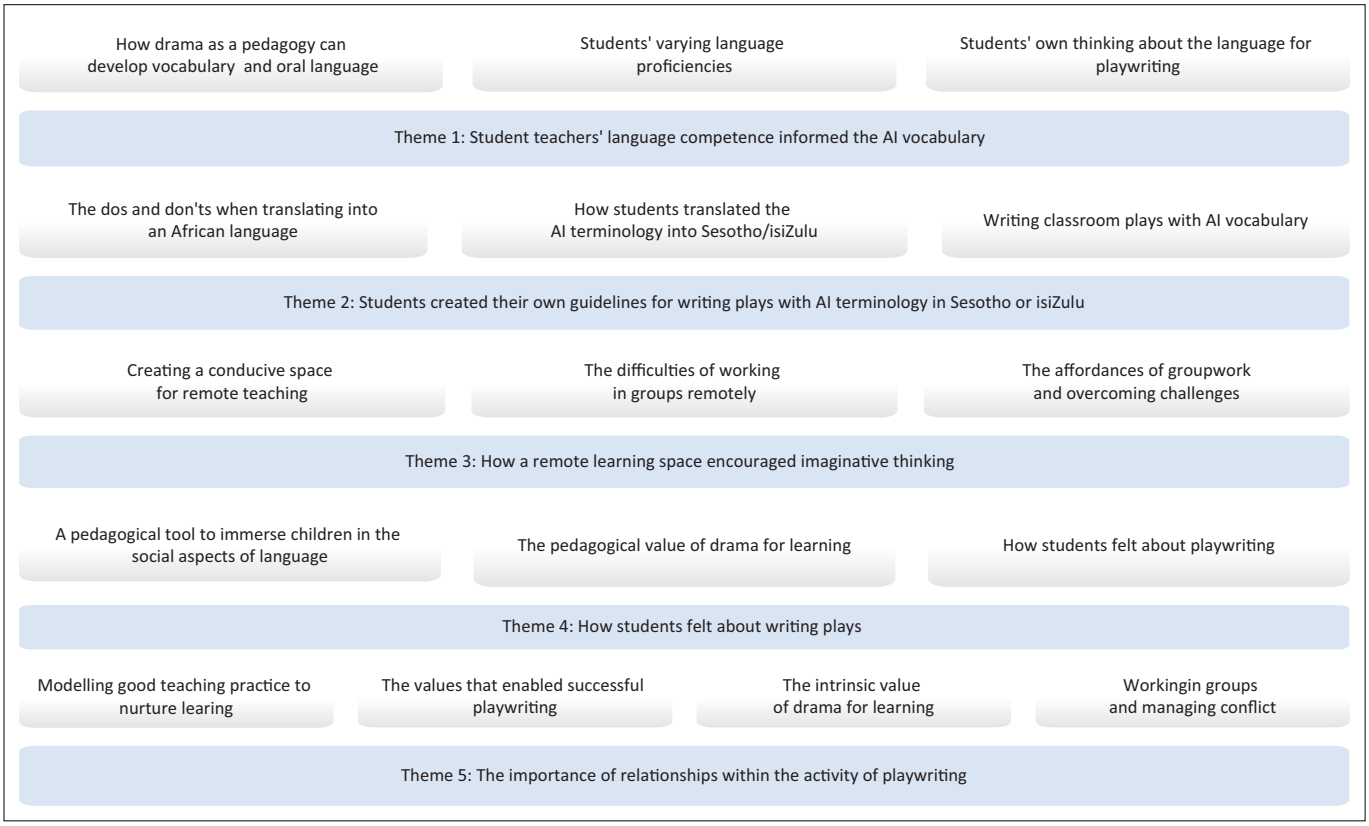
Discussion of the findings

The main findings of the study were that playwriting as a tool for pedagogy was useful for developing student teachers' vocabulary of AI in two African languages as well as developing their playwriting skills. The findings also showed that students valued and benefited from the lecturer's engagement to complete their playwriting task. Without this support and engagement, it would have been difficult for the students to have a fruitful online experience. These artefacts were important not only as assessment tasks on which they were graded, but also as artefacts that were ready to be added to their toolkit of teaching tools. In the following sections



AI, artificial intelligence.

FIGURE 7: Further analysis of the provisional categories to generate categories.



AI, artificial intelligence.

FIGURE 8: Generating themes from the categories.

the themes that were identified from the students; interviews are integrated in a discussion of the overall findings. As illustrations in the discussion extracts from the participants verbatim responses are included. These extracts form part of the PhD thesis of Mosa Khasu and will be made available on the university's repository. Each theme discussion is followed by extracts (Figures 9 to 18) from the students' interviews with utterances that capture aspects of the theme.

The playwriting activity and creating artificial intelligence vocabulary in Sesotho and isiZulu

At the outset of the playwriting process, it was evident that students were comfortable with writing a play. Initially, they thought that the playwriting activity would require little cognitive demand, or that it was similar to writing a story that children could either read, or act out without a script, or simply listen to in the classroom. Even though the students were not concerned about the playwriting process because they followed systematic guidelines for playwriting, they struggled at the outset to grasp the style of a dramatic text which consists largely of dialogue (coupled with actions). Extracts from the interviews capture some of their challenges. Extract (Figure 9) highlights authentic translation.

Student 1/L 6–9: 'It was a bit tricky because isiZulu *ngesinye isikhathi siyasigega* [at time we avoid using the correct isiZulu], *sibenzisa sa la eGoli* [we speak the isiZulu in Gauteng]. The play required us *ukuthi sibhale isiZulu sangempela* [to write proper isiZulu]. So, thank God, most of my group members kunalaba abaphuma *eKZN* [those from KZN], *nalaba abazi isiZulu sangempela* [those who know proper Zulu].'

Student 26/L 1052–1054: 'That one was a bit tough because [giggles] like in our group. *Kuna bantu aba strong ngesiZulu* [we had some group members who were strong in isiZulu]. Then, *Kuna bantu abangekho that strong ngesiZulu* [some group members were not that strong in isiZulu].'

Student 12/L 447: 'The reason being Mam is the gap between English and isiZulu.'

FIGURE 9: Extract 1.

Student 12/L 377–378: 'And to know that when you are struggling with certain ideas, there is always someone to help you.'

Student 25/L 856–858: 'And because I'm slow I take time to understand things. It was difficult to work on the phone. *Ke ne ke hlopha di group members tsaka all the time, especially Dimpho* [I was always bothering my group members all the time, especially Dimpho]. You know texting her frequently and calling her that I need your help.'

Student 26/L 1056–1058: 'So, in our group, two people were strong in the language. Like if there are things that we are not sure of or not understanding we would ask them. They would be the ones who help us.'

Student 37/L 1452–1453: 'I would think for me, Mam. I also relied on the help from the members of my group.'

FIGURE 10: Extract 2.

Making sense of the artificial intelligence terminology

To make sense of the AI vocabulary, the participants referred to the importance of communicating with one another and asking for help when necessary. The guidance from their peers gave them some assurance about the terminology they created. They also mentioned that asking for help and reading the dialogue that other students wrote enhanced their vocabulary. Krashen and Lee (2004) noted that good writers read and edit their work with others to come up with new ideas. They were also aware of their peers who they perceived as linguistically proficient in their groups.

Another aspect of making sense of the AI terminology required the participants to demonstrate some linguistics competence in the language. The researcher found that students were unable to articulate their phonological knowledge of the language. Rather, they vaguely mentioned that the knowledge of grammar and syntax was important. One student mentioned how they analysed the AI vocabulary by focusing on the entire word, instead of synthesising the morphemes that are required to form the translated AI vocabulary. Another student noted that the terminology that they could not translate was simply written in English and noted with italics in their play. Students simply reverted to translanguaging (see Figure 10).

Avoiding direct translation

Translating from English to an African language can be a complex process that requires good linguistic knowledge of each language. Ntshangase-Mtolo (2009) argues that it is difficult to attain equivalence when applying direct translation between two languages that are different in structure. This is because there are differences in the linguistic units, particularly in the morphology and syntax of these languages. Furthermore, she argues that direct translation could lead to "a meaningless translation, which is not comprehensible" (2009:16). Students also noted that direct translation was problematic and not suitable for translating the AI terminology. They also mentioned that direct translation without considering the meaning of the words, often made it difficult to create the AI vocabulary. This is evident in Extract 3 (see Figure 11).

Student 9/L 239–241: *'Uhmm Mam, emm amanye amagama awatranslateki so, amanye besiwa bhala njengoba enjalo bese siwafaka ama italics ukuthi sikhombise awulimi lokubolekwa* [some words you can't translate. So, we would write them as they are and put them in italics to show that they are borrowed words].'

Student 12/L 435–438: 'Like, let us analyse what does the word 'artificial' mean? Because we know that when we are conducting, artificial is all about machine studying, using machines to explain or to elaborate certain things. Like the machine replaces the human being nature of capacity of reasoning. So, for *'artificial'* it may go with 'imishini' [machines] in isiZulu and intelligence has to do with *'ukuhlakanipha' [intelligence],* the ability to be an expert on a certain thing.'

Student 17/L 571–573: 'So instead of writing like artificial intelligence, we zoomed into each word because we didn't know how to translate it. We didn't know how to translate because it doesn't exist in the system. So, we just decided to Zulu right tools, like dictionaries even online ones.'

FIGURE 11: Extract 3.

Student 1/L 53–56: 'Ok Mam. *Kwesinye isikhathi* [at times], when we were translating, sometimes it doesn't make sense if *wenza* [you do] direct translation from English to isiZulu. Because direct translation is not working. Sometimes you understand something when it's explained in English, but when you must bring it to isiZulu it becomes a different concept.'

Student 13/L444: 'Yes. Kodwa khona [when it comes to] the translation from English to isiZulu was a bit of a challenge.'

Student 13/L 450–451: 'Oh ok. We had a problem when it came to direct translation, when it comes to the scientific words. To translate them directly to isiZulu was a problem.'

FIGURE 12: Extract 4.

Constructing the AI vocabulary in an African language was the pedagogic aim of the playwriting process. As such, it would distinguish the classroom plays from typical children's theatre plays. When they were asked how they invoked the meaning of the AI vocabulary it became apparent that the students found it hard to write dialogue that included AI vocabulary with a distinctly Sesotho or isiZulu linguistic character. Even though they could speak the language. Non-mother tongue students expressed concerns about lacking some proficiency in reading and writing in the languages, even though they are conversationally proficient in the oral versions. In Extract 4 (see Figure 12) it is evident that students are wary of direct translation and opted for loan words and general translanguaging and code switching.

The comments by the students showed that all students experienced some difficulty when translating the AI vocabulary. It was notable that mother tongue speakers did not articulate a better understanding of the linguistic aspects of the language. They also did not explain their thinking in detail about their construction of the AI vocabulary.

Student 14/L 515–518: 'Hi mam. OK, when it comes to creating the play, initially I was happy and very comfortable because I am even Zulu myself and I also like this, creating stories and play activities, so I really enjoyed it. It was a bit difficult though. Infusing the AI thingy to into the play, but yeah, I think we managed.'

Student 30/L 1184–1186: 'Uhmm Mam, it was quite difficult to create that play and Sesotho, because all of us, if not most of us are not Sesotho home language speakers. And we also didn't do Sesotho in our high school years.'

Student 31/L 1211–1214: 'You know, we are so diverse in mindsets and our perspectives are different. So, we had to come up with something which was going to prove to be all right for us. But then also, the use of the South African Sesotho when you are Pedi was not that amazing.'

Student 32/L 1199–1201: 'See those English words, there's some things that we can translate like conjunctions. But like when actual nouns it's very hard to translate nouns because of *ba re keng* [you know what], the language is not our first language. Yeah, so that was very difficult.'

Student 36/L 1434–1437: 'Uhmm. Mam for me because I'm also not a Zulu student. So, it was so hard for me to translate some because words and uhmm Yes, ma'am. And then to English. Plus, ma'am, I speak isiXhosa.'

FIGURE 13: Extract 5.

Student 15/L 552–555: 'I learned to cope with people and to see things from other people's views because most of the time I'm used to working by myself and doing things my own way. But then this was a platform where you listen to whoever else is ideas and then we could try and make them more like, so it was a nice experience after all.'

Student 15/L 651–653: 'But then I think this was a chance for me to learn to be patient with people, but at the same time and learn to understand other people and it also gave us a chance to learn. OK, it's not everyone that is going to do things in your way, so you must be understanding and open to other people.'

Student 17/L 632–634: 'So, and it was very frustrating, and I couldn't relax because I knew if I relax things are not going to go my way. And if things don't go my way, it's not nice. It's not good. Even when they don't like it. Thanks.'

Student 23/L 828: 'So, I would say during this experience I've learned a lot when it comes to myself.'

FIGURE 14: Extract 6.

Student teachers' shared experiences about the playwriting activity

Driskell et al. (2006) argue that working with other people requires an awareness of your own character and personality. The students said that they had to overcome several obstacles in their interaction and learn from their own character or personality traits, such as bias. Some of their personality traits that they considered problematic included being impatient, striving for perfectionism, not listening to others, being controlling, or wanting to dominate others, and not understanding how other people communicate. They also mentioned that they had to learn how to manage stressful situations. In their reflections they added that such qualities hindered efficiency. Although students mentioned some of these problematic aspects, it was important that they overcome them and work on their own characters so that they could become better within their respective groups. The advantages and the joy of shared work is evident in Extract 5 (see Figure 13) and Extract 6 (See Figure 14).

It was important to maintain a safe online learning space to minimise uncertainty. Strauss, Griffin & Parker (2012) note that there is often uncertainty when students are required to work in groups. Working in this way can 'induce anxiety, which can manifest itself both cognitively and affectively' (p. 580). Such anxiety may influence how students work in their groups. As their lecturer, it was important that Mosa guided the student teachers in how to resolve conflict, work productively and maintain pleasant relations among another. The following extracts illustrate how they regarded collaboration. There is an undertone of appreciation for the lecturer's support and guidance in the challenging online modality. Extract 7 (see Figure 15) gives a glimpse of this.

Student 16/ L 636 -639: 'Uh, mam regarding the fact that you wouldn't have thought it was as *hot* as we are saying. I think that was because we just all recognize that there really wasn't any time for quarrels or complaints, or I don't know disagreements. You know we used to call each other out here. You know when we say it's 18:00pm and time for our meeting. We all had to be there.'

Student 23/L 833–835: 'But I guess being firm and consistent with your work, it helps. Like she covered some people, they just relax when working in groups.'

Student 31/L 1215–1217: 'Then I remember that I also had a little bit of a fight with my group members because of that. But then yeah it was hectic, but we did it. So that's what I'm just saying. At the end of the day, we did what we're supposed to do, and we reached the end goal.'

Student 36/L 1473–1475: 'Like we could easily delegate the roles to ourselves because we are not large in numbers. So, *bekungana muntu ocashe emva komunye* [there was no one who could hide behind anyone]. So, when it came through and delivered and we played our roles.'

FIGURE 15: Extract 7.

Student teachers' views about the pedagogical value of drama for learning and teaching

The participants emphasised that the pedagogical value of drama extended beyond playwriting. One of the ways of showing that dramatic play has pedagogical potential is by performing the plays. Although the students did not have the opportunity to produce their plays in the classroom because of COVID-19 restrictions, they planned to produce their plays in the classroom. There was consensus about they use this method in their own classrooms. One student reminded her group that children will recall words and, with that, also concepts and that learning about AI showed them that it is possible to integrate drama with science. Gradually the students became of the multiposed aims of classroom plays - as is evident in some of the utterances in Extract 8 (see Figure 16).

The lecturer as facilitator and 'human mediator' in the playwriting activity

Communication with the student teachers throughout the playwriting activity was important, especially during the remote learning period during lockdown. The first author communicated with the students through emails, announcements and discussions posted on in the modules' learning management system at the university and through WhatsApp messaging. Each group formed a WhatsApp group, where the lecturer could also provide detailed feedback as they engaged in the playwriting activity in the individual groups. The communication on the WhatsApp groups facilitated the 'semiotic mediation' as well as the role of the 'human mediator' (Kozulin 1990, 1998, 2003)

Student 7/L 284–285: *'Bayakhona noku discasa* [they can discuss], while they are engaging physically rather than ukufunda babuke[learning using worksheet]i-worksheet.'

Student 10/L 287–289: 'Yebo Mam. It would be helpful because children can learn actively. When they are acting, they can watch other learners act and say those words. As they perform *lama gama azohla enqondweni yabo* [They can retain these words in their memory].'

Student 13/L 358–360: 'If we had the opportunity to take the same drama that we created and play it to those learners, they would have understood it. So, the idea that it is possible to integrate dramatic plays in science classrooms was a great experience.'

Student 17/L 593 –595: 'I would say that a play is also engaging, which is very important for the learners for them to understand, they need to, they need to be involved in that lesson. So, a play allows them to see they can even take part like be they the actors.'

Student 24/L 846: 'So, face to face would have been nice if we were able to work with children and perform our plays.'

FIGURE 16: Extract 8.

(Figure 1) because it was a platform where student teachers could seek clarity about the playwriting content and readings. Communicating with the student teachers in this way contributed to the completion of these plays. Additionally, it was in these WhatsApp group where the lecturer formed relations with the students – creating a space that was conducive to learning. It also afforded her the opportunity to get to know them better as emerging playwrights, and to note their strengths and where they needed support. This is evident in Extract 10 (see Figure 18).

Kozulin (2003) explains the role of the human mediator as defined by Vygotsky's (1978) theory through the notion that:

> [*E*]ach psychological function appears twice in development, once in the form of actual interaction between people, and the second time as an inner, internalized form of this function. (p. 19)

The students appreciated individual feedback about their writing on the learning management system and in their WhatsApp groups. Although they would have preferred to learn how to write plays in a face-to-face modality, they appreciated the opportunity to learn conceptualise a new pedagogy that they could implement in their own classrooms.

Conclusion

The findings in this study showed that playwriting has much potential as a pedagogical tool for teaching vocabulary (Gray & Yang 2015). In this study, the students were challenged to think creatively about the isiZulu and Sesotho AI terminology. It was also evident that the playwriting task itself was a valuable learning experience for the student teachers. From the perspective of the theory of Lev Vygotsky (1978, 1986, 1997), it was, furthermore, evident that *semiotic mediation* can be a complex phenomenon when different languages are involved (Kozulin 2003). The study also showed that the human mediator of the learning activity fulfils a crucial role, especially in online learning mode. Apart from the plays

Student 35/L 1405–1407: 'You tried your best Mam to communicate with us, under these circumstances. You never forgot when we had meetings or reminded us to submit our work. Especially because we were at home.'

Student 26/L 1166–1169: 'I think it's more it's a bit personal when it comes to you. I think my issue is I'm very scared of my lecturers. I get scared and I'm afraid to even ask, even if like maybe there's something, I'm really scared. But with, you know, I was not scared. To think the first time when I went to the lecture hall and you were teaching, you were smiling. I was like, okay, I kind of like her. So, I really, really enjoyed more than anything. I enjoyed you being our lecturer.'

Student 16/L 712–713: 'I'm I was very comfortable knowing that you were available as much as you can, especially in the WhatsApp group chats as well.'

FIGURE 17: Extract 9.

Student 2/L 174–180: 'Like you basically make us work for our marks, you know, and I appreciate that because it's in the feedback that you gave us. Like we see through your marking that we see that you read word for word. You know, you see things that we didn't even see in our own reviews and so forth. Every single time when you give us our comments back, everyone would be like 'where did she see that? I don't even remember doing that'. You're very critical and that and you really read thoroughly. So that pushes us and forces us give the extra effort because we're like no ways, if I miss this, I know she's going to get this.'

Student 19/L 703–705: 'Like the fact that when we consulted with you. You would constantly, you know give us feedback regardless of what time we met. Even if it was after eight o'clock. We appreciated that Mam because I really feel that way. It's appreciated.'

Student 21/L 799–801: 'Because, like you put in so much effort to ensure that every student understands the assignments, tests, and everything. So uhmm, yah the content in the module becomes easier in that way. I can say that you put in so much effort that benefits the students.'

Student 31/L 1274–1275: 'Ok. Well for me. I like how you gave us feedback. It was detailed and it showed me when I need to improve.'

FIGURE 18: Extract 10.

that were written by the students, which meant that the *objective* of the learning activity had been reached (Figure 1), there were other outcomes too. The students learnt from one another, expanded their own vocabulary of AI, and increased their ability to work in virtual groups, guided by their online human mediator. These students opened up in a lovely way by speaking directly to their lecturer in Extract 9 (see Figure 17). Their conversations had many similar utterances - pointing to the relation(ship) quality of teacher education.

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Authors' contributions

M.N.K. contributed to the conceptualisation of the study and wrote the original draft of the article. Additionally, M.N.K. contributed to the collection, the analysis of the data and in generating the themes for the discussion in the findings. E.H. contributed to the conceptualisation, the supervision, and to the formal analysis of the study.

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Data availability

The data that support the findings of this study are not publicly shared, due to the privacy, and ethical restrictions.

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