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Using LEGO® Six Bricks® as an educational resource to address challenges pre-service teachers face during school-based teaching practice

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Abstract

Pre-service teachers in South Africa frequently encounter challenges during school-based teaching practice, including a persistent theory-practice gap, insufficient mentorship, difficulties in classroom management, and struggles with curriculum differentiation. This study investigates the use of LEGO® Six Bricks®—a play-based, low-cost, and scalable educational resource—as a pedagogical tool to address these recurring challenges. Adopting a Participatory Action Learning and Action Research (PALAR) approach within a transformative paradigm, six final-year Foundation Phase students from a South African university were purposively selected to integrate LEGO® Six Bricks® into their teaching practice placements. Data collection was guided by PALAR and framed by Kolb's experiential learning theory, enabling iterative cycles of planning, implementation, reflection, and adaptation.

Key findings indicate that the use of Six Bricks® not only enhanced learners' engagement and pre-service teachers' confidence, but also significantly contributed to developing professional identity, building rapport with mentor teachers, and facilitating inclusive pedagogical practices. Moreover, participants demonstrated increased pedagogical agency through curriculum innovation, classroom management strategies, and formative assessment techniques. The study concludes that experiential engagement with playful resources such as Six Bricks® fosters reflective practice and bridges both the theory-practice and belief-practice gaps in teacher education. It recommends structured training, reflective mentorship, and continued research into contextually relevant, low-threshold pedagogical tools to better prepare student teachers for the complexities of South African classrooms.

Keywords: Pre-service Teacher Education; Experiential Learning; Play-Based Pedagogy; School-Based Teaching Practice; LEGO® Six Bricks®

Introduction

School-based teaching practice placements are essential components of teacher training programmes that offer pre-service teachers valuable opportunities to gain real-life experience in the career they choose. Many pre-service teachers do, however, experience a vast range of challenges during these immersions into the real world of teaching that leads them to doubt their own skills and even their career choices (Bergmark et al., 2018; Low et al., 2017). Extensive research over the past few decades highlights the impact of a theory-practice gap (Allen & Wright, 2013; McGarr et al., 2016), the apprenticeship of observation (Botha, 2020; Botha & Reyneke, 2020; Lortie, 1975), lack of support from mentor teachers (Baartman, 2020; Dan & Simon, 2021; Ó Gallchóir et al., 2019), difficulty in curriculum implementation and differentiation (Arasomwan & Mashiya, 2021; Loukomies et al., 2021), as well as struggles with classroom management (Mkhasibe & Mncube, 2020; Weber et al., 2018) as significant challenges during school-based placements. Despite the well-intentioned objectives of teaching practice, it seems that pre-service teachers still often struggle to fully benefit from these experiences.

This article reports on a research study that initially explored the value of play-based learning and the experience of using LEGO® Six Bricks® as an educational resource during teaching practice in the Foundation Phase classroom. In an unexpected but considerable finding, the participants reported that experimenting with this resource not only added value to learners and to their own pedagogical approaches (Breytenbach et al., 2025), but also mitigated some of the prominent challenges they encountered during teaching practice placements. Unintentionally, but significantly, the findings of this project contributed to the relevant discourse and body of knowledge on optimising the teaching practice experience as part of the professional development and preparation of pre-service teachers.

Background to Six Bricks® project in South Africa

LEGO®, and its sub-brand for younger children, DUPLO®, is a globally known toy brand which consists of a great variety of plastic interlocking bricks that can be combined and assembled in different ways to create concrete and abstract objects. The hands-on and tactile nature of this toy lends itself to effective use in an educational, rather than just recreational context (Campbell, 2004; Pirrie, 2017). The open-ended nature of LEGO® play invites children of all ages to use their imagination and creativity to solve real-life problems and even learn new skills (Dunn et al., 2017; Hussain et al., 2006; Moreau & Engeset, 2016). The

different sized and shaped bricks can also assist in understanding abstract concepts in subjects such as mathematics, science and language (Moreau & Engeset, 2016; Parker & Thomsen, 2019). In addition, manipulating and connecting the bricks supports the development of motor, cognitive and social and emotional skills for smaller learners (UNICEF, 2018). It is clear that playing with LEGO® bricks encourages active learning and engaged participation (Dunn et al., 2017; Matangira, 2022; Parker & Thomsen, 2019). Research show that by encouraging learners to construct, manipulate, and interact with LEGO® bricks, educators can create interactive and immersive learning environments that cater to various learning approaches and promote critical thinking skills.

The LEGO® Six Bricks® initiative was conceptualised in South Africa as an educational resource to support teachers in implementing the curriculum specifically in the Foundation Phase (Grade R – Grade 3). LEGO® Six Bricks® is six multicoloured DUPLO® bricks (dark blue, light blue, green, red, orange and yellow) that are used as a manipulative to guide playful learning in classrooms. The aim of using six DUPLO® bricks is to create a simple, cost-effective, and scalable solution for resources in diverse South African schools. The pilot projects were so positive that, in 2017, the Department of Education and UNICEF initiated a national rollout of the implementation of LEGO® Six Bricks® as a teaching resource in the Foundation phase in all South African schools (Care for Education, 2022b). The use of LEGO® in South African schools contributes to bridging the educational gap by promoting inclusive learning opportunities for learners with diverse backgrounds and different contexts (Care for Education, 2022a; LEGO Foundation, 2021; South Africa: The Good News, 2022; UNICEF, 2015). Although the project has gained significant traction, it is still ongoing and has only been implemented in some provinces.

The university involved in this study is, at the time of writing, the only tertiary institution in the country that signed a service-level agreement with relevant stakeholders in 2019 to conduct research on the use of LEGO® Six bricks® in Foundation Phase classrooms. More importantly, all first-year students are trained to use this resource during their school-based teaching practice placements. Some students would, therefore, find themselves in a teaching practice environment where mentor teachers have been exposed to training and provided with the resources for all learners in their class, whereas other students would be in a school where this project has not been rolled out yet. It was also significant to note that many teachers had training but no physical resources, whilst other schools received the physical bricks but no training.

In one of the action research projects that resulted from this institution's involvement with the LEGO® Six Bricks® initiative (ethical clearance was received from all relevant stakeholders), the experiences of six final-year foundation phase students using the Six Bricks® as teaching resources were explored. In the first cycle, the participants received training in using Six Bricks® as a teaching tool; whereafter, they were each issued with 30 sets of bricks to use during their four-week teaching practice placement. They were invited to not only use the strategies suggested during the training but also to experiment with their own ideas on using the resource in Foundation Phase classrooms across the country. The initial research questions dealt with, amongst other things, the advantages and practical challenges they experienced with using the resource. During a subsequent reflective cycle, the participants not only validated the functionality of the resource in teaching mathematics, literacy and other soft skills, but indicated significant personal and professional growth during this project. It seemed that using this resource not only contributed to the quality of their pedagogy and teaching but also addressed some of the challenges they often experienced during school-based teaching practice.

Challenges during school-based placements

As early as 2009, in a highly cited study, (Allen & Wright, 2013) highlighted that pre-service teachers seemed to be aware of what they called a theory-practice gap, but was unaware on ways to address this once they entered the profession. A theory-practice gap is defined as the challenges beginner teachers experience in applying the theoretical knowledge, they studied during their teacher training programmes to real-life scenarios they encounter in classrooms (Allen, 2013). Seminal works like (Darling-Hammond, 2006; Veenman, 1984)and (Korthagen, 2016) attempted to define and describe this so-called divide. Several more recent studies, including international studies like (Pale et al., 2023; Phillips & Condy, 2023) and (Botha & Rens, 2018) corroborate this definition and validate these experiences that beginner teachers report. This begs the question whether sufficient progress has been made in better equipping pre-service teachers to successfully and confidently make the transition into the workplace. It is also important to consider that this phenomenon is not limited to their experience once they enter the workforce as beginner teachers but it seems to already manifest during teaching practice placements, and it is therefore listed as a significant challenge during school-based placements.

Although the theory-practice gap is indicated as a major challenge during teaching practice, the belief-practice gap also deserves acknowledgement. Many pre-service teachers enter school-based placements with expectations and pre-determined ideas about how their experience should be. Very often their experiences do not meet those expectations and they find themselves disillusioned or disappointed. Many pre-service teachers also report a sense of isolation and lack of support from the mentor teacher during their school-based placements (Erasmus, 2022). They experience a much greater need for support than what they seem to receive.

A noticeable way that many pre-service teachers deal with the theory-practice gap, as well as the belief-practice gap, is to, rather than employ the techniques and skills they learnt at university, revert to emulating what they remember their own former teachers doing while they were still learners in school. Lortie (1975) coined this as the 'apprenticeship of observation' and it can be summarised as the naive and linear idea that many pre-service teachers have of what the career entails. During their own schooling, they formed perceptions of what they defined as good practice and fall back upon that in times of stress. This inhibits their ability to be innovative and to transfer the skills they learned to the classroom (Botha, 2020; Boyd et al., 2013). Instead of student-centred and innovative teaching strategies, they might revert back to simply teaching from a textbook. These strategies are often teacher-centred and do not address 21st-century needs or acknowledge the true complex nature of teaching (Botha, 2020).

Classroom management is stipulated as one of the greatest challenges of school-based teaching practice placements (Mkhasibe & Mncube, 2020; Weber et al., 2018). Pre-service teachers feel overwhelmed and they struggle to effectively manage the classroom. This includes much more than mere classroom discipline, but includes matters like routines upon entering and leaving, classroom organisation and logistics. A last, but significant challenge includes curriculum implementation, pacing and specifically differentiation to meet individual learner needs. In South Africa, many mainstream schools have to accommodate learners with special needs, and inclusive education is a challenging field for all. Teachers are left to their own devices to differentiate the curriculum as well as teaching and learning activities in the classroom (Loukomies et al., 2021). This challenge is compounded by large numbers of learners in a class, which is the norm in public schools (Mbatha, 2024) . There are no classroom assistants and very often a lack of space and resources that the Foundation phase teachers needs to navigate around.

In addition to experiencing internal challenges, many pre-service teachers report not receiving adequate or effective guidance from mentor teachers they have assigned to them for the duration of their teaching practice placement. Pre-service teachers report that mentor teachers are often not open to new ideas and expect the students to merely copy their practice as they have often been doing it for decades (Ravhuhali et al., 2020). They do not prefer the students to employ and experiment with new teaching strategies, and often student-centred strategies contribute to challenges with classroom discipline. Some mentor teachers do not actively engage with the pre-service teachers and expects them to either observe or they leave the student alone to present all the lessons without any support or guidance (Erasmus, 2022).

This study explored the impact that using LEGO® Six Bricks® as a teaching resource in the Foundation Phase classroom had on the ability of pre-service teachers to mitigate some of the abovementioned challenges. Kolb's experiential learning (Kolb, 1984; Kolb et al., 2001; Meijer et al., 2022; Morris, 2020) was selected as a theoretical framework to illustrate a possible intent and process of teaching practice placements. While several pedagogical interventions attempt to reduce the theory-practice divide, it is useful to to evaluate what distinguishes LEGO® Six Bricks® from other interventions during teaching practice. Microteaching offers controlled opportunities to practice skills and has demonstrated effectiveness in shaping specific teaching practices (Amobi, 2005; Kpanja, 2001). However it often does not address the complexity that characterises Foundation Phase classrooms in a true classroom setting. Digital tools like mixed-reality simulation as supplied by Mursion, create structured rehearsal spaces that support reflective practice and decision-making opportunities and feedback from lecturers (Nel et al., 2024; Nel & Marais, 2023; Straub et al., 2023). It requires substantial technological infrastructure, reliable connectivity, and institutional investment. These are just some examples, and each have LEGO® Six Bricks® offers an additional approach to these through its low cost, tactile nature and adaptability. It allows pre-service teachers to experiment innovative, play-based strategies in authentic classroom settings, to practise real-time classroom management and differentiation to engage learners through play. This makes LEGO® Six Bricks® a tool with particular relevance.

Experiential learning as a theoretical framework

Pre-service teachers have to complete a required number of teaching practice weeks as part of their initial teacher training programme (SA, 2015). The co-planning and co-teaching teaching practice model followed by the institution in question, not only focuses on pre-service teachers

observing a mentor teacher, but also on planning and presenting lessons in a real-world classroom. The aim of teaching practice is therefore to guide pre-service teachers to critical reflection of the practice of their mentor teacher on the one hand, and their own teaching on the other (Abongdia et al., 2017; Erasmus, 2022). These proposed activities and reflection align with Kolb's theory of experiential learning, a pedagogical approach that emphasises the importance of learning through experience and reflection (Healey & Jenkins, 2007; Kolb, 1984; Meijer et al., 2022). It is based on the belief that individuals acquire knowledge and skills best when they actively engage in real-world experiences and then reflect on those experiences to make sense of what they have learned (Morris, 2020). Kolb argues that learning takes place through continued cycles of concrete and active engagement in experiences, reflecting on those experiences, conceptualising their findings, and applying their new knowledge in practical situations (Kolb, 1984; Kolb et al., 2001; Lehane, 2020; Morris, 2020). In the first stage, concrete experience, pre-service teachers engage directly in real-world classroom activities such as lesson planning and co-teaching. This hands-on experience provides a foundation for their learning process. The second stage, reflective observation, involves critically reflecting on their experiences and the mentor teacher's practices, enabling pre-service teachers to identify successes and areas for improvement. Abstract conceptualisation, the third stage, requires pre-service teachers to synthesise their reflections and experiences into meaningful insights and theoretical understandings about effective teaching practices. Finally, active experimentation encourages pre-service teachers to apply these new understandings and insights in subsequent teaching opportunities, continually refining and adapting their pedagogical approaches. Thus, Kolb's model ensures continuous learning through iterative cycles of experience, reflection, conceptualisation, and experimentation, fostering the development of essential teaching competencies as pre-service teachers explore, experiment, and adapt their pedagogy during their teaching practice.

Research Methodology

This qualitative action research study was approached from a transformative paradigm as the initial aim was to explore how six pre-service teachers could use LEGO® Six Bricks® as a teaching resource during teaching practice placements. The population for this study was the cohort of final-year foundation phase students at a university in South Africa. Purposive sampling was used to identify six pre-service teachers who showed an interest in LEGO® Six Bricks® and volunteered to experiment with the LEGO® bricks during their teaching practice. Ethical clearance was obtained from the tertiary institution in question. The following table

highlights demographical and contextual details about the participants and the schools they were placed at for teaching practice. Table 1 elucidates on the demographic and contextual details of the participants:

Table 1: Demographic detail[1]

	Type of school	**Completed level 1 LEGO ® training**	**Province**	**Grade**	**Number of learners**	**Number of Six Bricks® sets**	**Did the mentor teacher receive Six Bricks® training**
Participant 1	Private	Yes	Free State	2	15	10 sets	Yes
Participant 2	Public	Yes	Western Cape	1	34	0 sets	No exposure
Participant 3	Public	Yes	Gauteng	2	25	35 sets	No exposure
Participant 4	Public	Yes	KwaZulu Natal	All (1)		35 sets	No training yet
Participant 5	Public	No	KwaZulu Natal	3	38	0 sets	No exposure

The research questions dealt with the pedagogy of using this resource and subsequently with the ability of this resource to mitigate some challenges pre-service teachers reported experiencing during school-based practice placements. Participatory Action Learning and Participatory action learning and action research (PALAR) was selected as a methodology for this study as this multifaceted framework is designed with two main goals in mind: to address and resolve real-world challenges while also promoting a sense of learning and empowerment among those involved (Leeker & Palomar, 2024; Wood & Zuber-Skerrit, 2013; Zuber-Skerritt, 2018). During the first PALAR cycle (figure 1), participants were invited to attend a training session presented by an accredited level four LEGO® trainer on how to use LEGO® Six Bricks® as a teacher resource in the foundation phase classroom before they were placed in a

[1] The anonymized participants gave informed consent.

school for a four-week teaching practice placement. The second cycle (figure 1) was conducted during that school-based placement and was structured around the four phases of experiential learning, namely concrete experience, reflective observation, abstract conceptualisation and active experimentation. Despite being placed in six different schools across the country, the participants and researchers continuously reflected via online platforms. The third cycle (figure 1) was completed once students returned to campus after their school-based placement and reflective group conversations were used to unpack their learning during the project as well as discuss the impact this experience had on their pedagogy as well as their experience of teaching practice in relation to such placements during previous years of study.

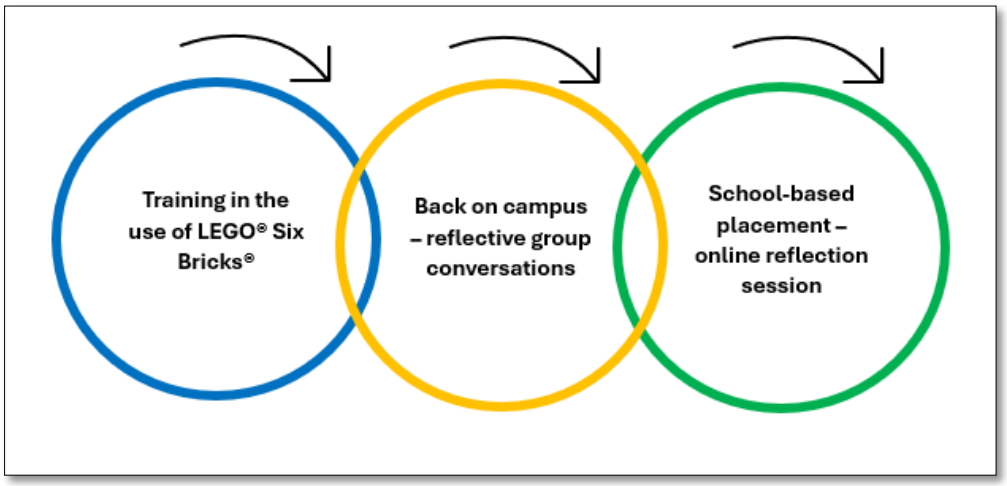

Figure 1: PALAR Cycles in this study

Findings

The following themes were evident from the findings:

Table 2: Themes identified in the study

THEME	Sub-theme
The pragmatic paradigm	Relationship with mentor teacher
	Context and logistics
	Classroom management
The philosophical paradigm	Apprenticeship of observation
	Academic versus soft-skill development

The pedagogical paradigm	Curriculum implementation Inclusive education Improving pedagogy

The pragmatic paradigm

Mentor teacher attitude

It was soon evident that, regardless of the enthusiasm of the student teacher, the attitude of the mentor teacher towards experimenting with new resources and alternative pedagogies were paramount in the student's experience of using LEGO® Six Bricks® during their school-based teaching practice. The six participants reported significant differences in the attitude that teachers displayed once they asked permission to use the LEGO® Six Bricks® in the classrooms. Participant 1's mentor teacher embraced this innovative strategy so far as inviting her to present it to the other teachers at a yearly expo the school hosted. The same was true of Participant 4's teacher, who, after seeing Participant 4 using the bricks, retrieved the boxes she received as part of the national rollout from her storeroom and immediately started using them as well. In Participant 2's case, the teacher was also very open to using the resource, but they did not have enough bricks for all the learners in the classroom, and she assisted Participant 2 in conceptualising adapted plans.

Not all teachers however had a positive reaction to the request to use Six Bricks® in their classroom. Participant 5's mentor teacher was very apprehensive about using this resource she was unfamiliar with since she had 38 learners in a very confined space, and she had immediate concerns about noise levels and classroom management. It was interesting to note, that of the six students, Participant 5 was also the one who was uncertain about this resource from the onset, so she was now expected to convince a teacher who was also sceptical to experiment with using the resource and it had a significant impact on the possible implementation. A lack of mentor teacher commitment can dampen a novice teacher's enthusiasm. The scepticism from some mentor teachers initially hindered participants' attempts to implement Six Bricks® in the classroom.

In the classrooms where the attitude of the teachers was positive, collaborating on using this resource helped the student teachers to build a rapport with their new mentor teacher (Izadinia, 2015). The initial conversation about experimenting with Six Bricks® immediately

addressed the challenge many pre-service teachers report about often not developing a positive and conducive relationship with their mentor teachers (Jita & Munje, 2022). It also created an academic platform where the pre-service teacher could indicate their need to observe and experiment with different teaching styles and methodologies, rather than being forced to only use a textbook or to replicate what the mentor teacher traditionally did in their class.

Mentor teacher engagement acts as a kind of gatekeeper for pedagogical innovation: supportive mentors encourage experimentation and reflective growth, whereas resistant mentors may reinforce teacher-centred approaches and the apprenticeship of observation.

Context and logistics

The six participants were placed in vastly different contexts which each presented individual challenges to the school-based teaching practice experience. Participant 5 was placed in a school that burnt down more than two years ago and still using temporary classrooms where they had to accommodate 38 grade 3 learners in one classroom. There was no space to move around and no designated area to play. In addition, the temporary desks were not stable so when they did use the bricks it would fall down all the time and disrupt the lesson. Participant 5 and Participant 2 shared the challenge of not having enough sets of bricks for learners to use individually, so they had to negotiate sharing and adapt their activities. Many pre-service teachers report struggling with adapting lesson plans and intentions, so this mitigated this challenge in the participants in this project (Vaughn et al., 2016). Participant 1, on the other hand, only had 14 learners in her class, so it was muchasier to navigate activities as well as time management, which is also a significant challenge pre-service teachers experience.

Adding a new approach to learning as well as alternative resources seemed to assist some of the participants in addressing contextual and logistical issues. An acute awareness of the socio-economic circumstances of learners is a critical component of successful teaching practice placements, and the contrast in these circumstances amongst the participants also highlighted their ability to adapt their classroom management practices.

> *Learners in the previous school where I was placed were very poor, they did not even have school shoes. They were not used to having resources in the classroom, if I brough something in, they broke it of secretly took it home. In this school the learners are the opposite. Their parents are very rich. Their needs are much more emotional than material… (Participant 3)*

Participant 1's learners also immediately took to using the bricks as an educational resource and dealt with it in a respectful manner.

> *On the first day I gave them the blocks and I asked them to feel the bricks and tell me what they felt. We discussed the structure of the bricks and the possible ways in which we could use it. I could see that LEGO® and DUPLO® was nothing new to them. They also understood that this was learning through play and not simply play time.*

Other participants did however experience that the socio-economic circumstances and the lack of available resources at their school impacted their intent to effectively use this resource:

> *My biggest challenge was that the learners purely thought it is play time because they were not used to using resources for learning. They literally thought it was blocks and therefore they should play with them. And play time is a noisy time. So I had to work hard at setting a routing and realising that it was not the same as outside play time... it changed a little bit towards to end of the four-week placement.... it got quieter and they didn't just think it was play time anymore, they were more focused (Participant 5).*

Classroom management

Once the mentor teacher gave the participants permission to use the resource in the class, they all opted to first try their hand at activities intended for recreation, entertainment, or classroom management. They did not have the confidence to immediately use the resource as a teaching tool. This was significant as these were fourth-year students during their seventh school-based placement, and one would therefor expect that they would have had experience of using different resources as pedagogical and teaching tools. It could be considered that as the play-based approach to learning was new to all of them, they lacked the confidence and opted for a safer environment to first test their skills with the LEGO® Six Bricks® sets. In the class Participant 4 was placed, learners used to watch a YouTube video during the last few minutes of every day. During her placement she invited them to rather play memory games with the Six Bricks® sets during that time. The focus therefore changed from mere entertainment, to learning.

Most participants reported struggling with classroom management during previous teaching practice placements. This also seemed to be the case when they introduced LEGO® Six Bricks® as a new resource in their foundation phase classrooms. Although learners were not outright being disruptive or naughty, working with the Six Bricks® enhanced the noise

levels in the classroom. This was not limited to learners' voices, but also the sounds of the individual bricks being clicked together. Initially, Participant 1's teacher was very apprehensive about the higher noise levels resulting from using the bricks.

> *My mentor teacher had such a big problem with this! Every time when I gave them the opportunity to build, she would tell the learners to "build quietly, build quietly.*

Participant 1 realised that this would not lead to an engaged learning environment and undermine the purpose of using the resources, so she was innovative in suggesting a new way to communicate with the learners in their classroom. They used different coloured bricks to indicate the level of learner's tone of voice. When the teacher placed her red brick on top, that indicated that they were busy with serious learning or assessment and no talking was allowed. When the orange brick was on top, learners were allowed to whisper to a peer to discuss the work or collaborate on a task. When the green block was on top, it was free time and the learners were allowed to play in the designated area.

She highlights how she felt empowered to better maintain discipline in her class once they implemented this approach:

> *It was so rewarding because instead of having to raise my voice I could simply point to the colour brick that was on top on the learners immediately adjusted the tone and volume of their voice accordingly.*

Experimenting with new resources and approaches, such as play-based pedagogies, seemed to address more challenges pre-service teachers experienced than building rapport with the mentor teacher, learners and classroom management. The impact of utilising this resource speaks to a larger domain than mere practice; it questions the philosophical paradigm and professional identity of both the mentor teacher and the pre-service teacher placed with them for school-based teaching practice. The response from the participants suggests that guided play approaches can improve self-discipline as the children learn to follow the rules in an enjoyable space. The experiences and adaptability of the participants show that when learners are actively engaged with clear instructions, classroom management is positive.

The philosophical view

The apprenticeship of observation

Research confirms that when pre-service teachers find themselves in stressful situations during teaching practice placements, they tend to fall back on their apprenticeship of observation and

what they had seen during their years of basic schooling, rather than what they been taught in their initial teacher training programmes (Napanoy et al., 2021; Opoku et al., 2020). Utilising Six Bricks® gave participants the opportunity to disrupt their apprenticeship of observation and critically reflect on the perceptions and expectations they had of their chosen career. Mitigating challenges related to the enactment and complexity of teaching (Weatherby-Fell et al., 2019) forces pre-service teachers to disrupt their pre-supposed ideas and align their experiences with expectations. Participant 3 became acutely aware of her own apprenticeship of observation and the influence that it had on her experience of school-based placement:

> *I grew up in a very traditional Afrikaans family. My grandmother was a teacher and researcher who firmly believed in a teacher-centred approach. When I came to university and I learnt about play-based and all these other types of pedagogies, I really changed my mindset and built my own teaching philosophy around all of these innovative pedagogies and teaching strategies. We never got an opportunity to practice this in class, but I was intrigued and could not wait to try all of this during school-based placements. But it was interesting that the way that I was raised took over quickly once I was in a classroom. I had good intentions to apply my newly learnt skills, but the moment I had to teach, I reached out to the traditional textbook (Participant 3).*

Participant 3 was in a privileged position to have a mentor teacher who supported her in using her LEGO® Six bricks® sets to support her traditional approach to teaching, not only disrupted her apprenticeship of observation, but created a safe space where she could experiment with and find a balance between teacher-centred approach and innovative student-centred strategies. The supportive environment not only empowered Participant 3 to explore a more pedagogical stance but also mirrors a broader trend among the participants, who seemed to gravitate toward using LEGO® Six bricks® to nurture essential soft skills and social-emotional skills before integrating them into more formal academic instruction.

Academic versus socio-emotional skills

Although most existing open educational resources focus on using Six Bricks® as a curriculum-based resource (Care for Education, 2022), the findings in this study highlighted the value of using this as a tool to develop soft skills and even 21st century skills. As mentioned, participants first used the Six Bricks® sets for classroom management and even fostering soft skills such as cooperation, conflict management, problem solving and critical thinking.

Participant 4 used the Six Bricks® to do a wellness check every morning. Learners were invited to select a colour, which they previously linked to specific emotions, to indicate their state of mind. Other participants used the red and blue brick to indicate learners' level of comprehension and confidence in the tasks they were busy with. Not all learners have the confidence to put their hands up if they need assistance, so using the bricks provided a more subtle way of asking for help. Should the blue brick be on top of the stack standing on a learner's desk, they were comfortable with the task they were busy with. Should they need help, they could simply move the red brick to the top of the stack, and the teacher, who would be moving around the classroom, would immediately be able to aid without drawing the attention of the whole class.

The notion of using the Six Bricks® to indicate emotion seemed to be a popular theme. In Participant 1's class, jealousy and wanting each other's toys was a significant challenge. The learners had never heard the word jealousy, so she used the green brick as a metaphor for jealousy and as a starting point for a lesson on sharing. It is important to mention that these activities were not all taught to the participants during the level 1 LEGO® Six Bricks® training, but that they conceptualised these to specifically address the needs in the individual context of their school-based placement. As the participants experimented with the resource, their confidence grew, and they all seemed to feel equipped to try their hand at using the LEGO® Six Bricks® as an academic teaching strategy.

The pedagogical paradigm

Curriculum implementation

Many pre-service teachers report struggling with curriculum implementation and pacing (Deborah & Mashiya (2021). Feedback from the participants indicates that this resource was a helpful tool for academic teaching and, in that way, addressed the challenges they faced with not having enough guidance for curriculum implementation.

Participant 4 thrived at creating activities to teach both numeracy and literacy. Participant 4 used the blocks to indicate various parts of speech. The green block represented a verb, and her learners quickly remembered that when they constructed a sentence, they should always include a green brick. In this playful manner, they learned a very important grammatical concept. She also used the studs on the bricks to aid her learners in counting in twos. This way, it was a tactile experience rather than just rote memorisation. She reported that it made some

learners less anxious about learning new concepts or doing mathematics. Participant 3 also shared an example of using the Six Bricks® to effectively facilitate cooperative learning:

> *For the lesson that my mentor teacher observed, I had to explain the concept of compound words. I wrote words on sticky tape and stuck it on the individual bricks. I used 15 sets of bricks, so there were 90 bricks that groups could choose from. I then invited them to, in groups of four, select different bricks to build as many compound words as possible.*

A significant finding of this study was that using the Six Bricks® not only empowered the pre-service teachers placed in these foundation phase classrooms to implement the prescribed South African curriculum in innovative and engaging ways, but it also addressed another significant challenge pre-service teachers faced during teaching practice, namely the effective integration of inclusive education in mainstream classrooms.

Inclusive education

Existing open-education resources for using Six Bricks® in a Foundation Phase classroom focused on mainstream activities related to the national curriculum in numeracy, literacy and life skills kills (Mpu & Adu, 2021; Schuelka et al., 2020). In South Africa, many special needs learners find themselves in mainstream classrooms, and teachers are expected to adapt curriculum for the inclusive education needs of their learners (Mpu & Adu, 2021). All the participants in this study agreed that the Six Bricks® sets were very effective for meeting these specialised educational needs. The innovative ways in which the participants used these bricks for teaching academic content as well as soft skills specifically targeted at their learners with special needs, were inspiring.

Participant 4 used the bricks to assist a boy who struggled with time management and planning. He quickly felt overwhelmed by what he was expected to do. Participant 4 used the bricks as a colour coding system to help him chunk his tasks and feel a sense of accomplishment when he completed a task.

> *We attached specific colours to his specific tasks for the day and then stacked the blocks in the correct colour order in front of him. Once he finished a task, he would move that colour block we started with, for example the blue block for maths, to the bottom. When he reached the blue block again, he knew that he had successfully completed all that was expected of him for that day.*

Participant 1 had a poignant experience with a non-verbal autistic boy who struggled to communicate his emotions. This little boy showed no interest in working with the Six Bricks® up to that point. She also used the six colours to explain various emotions and invited the learners to put the colour best describing their mood or emotion at the top of their stack; that way, the teacher, as well as their peers, could see and better understand their behaviour and needs. In this activity they referenced the dark blue brick as a symbol of being sad. During break time later that day, she had to reprimand this little boy because he did not want to share some toys. He was visibly upset and even started crying.

> *He turned around and walked back into the classroom, picked up his Six Bricks® and placed his dark blue brick on top. He marched toward me, pointed at me and then pointed at the blue block. I had to take a moment. I then just said "it's fine, you are allowed to feel sad.*

This was so significant as this was the first time that this little boy felt empowered to share his emotions and to communicate them to someone else. Participant 1's innovation not only allowed her to adapt her teaching to address the individual needs of special needs learners but also provided this young boy with a tool that he could now use in so many more contexts than Participant 1's foundation phase classroom.

These examples provide evidence that using Six Bricks® not only addressed direct challenges like better classroom management and improving their relationship with their mentor teacher, it also, through disrupting the apprenticeship of observation and adapting practices to address individual learning needs, impacted and enhanced their pedagogy.

Improving pedagogy

It was evident that, whilst they were experimenting with using the resource for both academic and soft-skill development, participants not only questioned their own existing classroom practices but also critically reflected on those of their mentor teacher. In some cases, it was even clear that the pedagogy of some mentor teachers was informed by using this resource.

> *My teacher really bought into the idea...she said she really loves the idea of having the blocks as an emotional guide because when you are [standing] in front of so many learners you don't know if Pietie who sits at the back who is really quiet, is quiet because he is sad or is he quiet because he doesn't understand.. (Participant 4)*

It is however also important to note that not all teachers felt comfortable with this resource and chose not to actively be involved when the participants used the resource in their teaching. Participant 3's mentor teachers felt that she did not receive formal training for using Six Bricks® and did not feel that she had the skill to create her own activities with the resource.

The participants seemed to have more courage to risk using the resource even though they had no guarantee that it would be successful. Participant 2 quickly realised that she could not immediately use all the coloured bricks in an activity, so she adapted and, during the next activity, introduced the bricks one colour at a time. During the first activity, she divided them into groups named for the colours of the Six Bricks®. She expected that the green group would locate all the green bricks during a scavenger hunt of the classroom. She hid different amounts of bricks in different places and wanted the learners to later use these numbers for a numeracy lesson on counting.

> *I thought it was fun and would expect them to also move around a little bit. But it did not work at all! They did not understand that, if you were in the green group, you were only supposed to gather the green bricks. They looked for the other colours as well and then they would try and store it up as if they were squirrels. So I realised that I had planned far too much. I had to take it slowly and introduce one colour at a time. This had a strong impact on my skills in planning and presenting lessons.*

Using the resource for different aspects of teaching and classroom management also provided the opportunity for these participants to critically evaluate their own practice and not have to depend on a mentor teacher to do so. Participant 3 used the bricks for memory games but soon found that half of her class was ready for more difficult memory games whilst some of the other learners still struggled with the basic memory games she started with. This conundrum made her realise that "in this case I didn't know how to differentiate it to be on the different levels in one classroom" (Participant 3).

Assessment literacy development is another crucial component of teaching practice. It was interesting to see that some participants also managed to use the Six Bricks® resource for formative assessment. Participant 2 shared her practice of using the blue and the red block when learners had to answer direct questions. Indicating their understanding through this simple method allowed her to measure learning, evaluate progress and adjust where needed.

It was also encouraging to note from the data that the participants acknowledged that they still had to experiment more with this, and other resources, and that they realised that they still had a lot to learn before they entered the profession.

> *I think I will use it in the future. I will just need to go back and try it again, I'm not 100% convinced yet, (Participant 5 row 586). I think I will use it, I see value in it and I saw that like the children liked it and they actually learned without them realising which is what I love about the play-based theory. I didn't see the full extent of the value this time around but maybe if I go to a smaller school now, I can try again and then yes.*

Although cognisance of and direct improvement of pedagogy is a higher order aim of school-based teaching practice, it seems that it very often does not occur. Many pre-service teachers only deal with navigating the basics and attempting to mitigate challenges, and they do not succeed in evaluating and analysing their learning and their practice. The findings of this study show that, through a play-based resource, that process is encouraged.

Discussion

The themes deducted from the data highlight the success of using Six Bricks® to not only improve the quality of the teaching practice experience but also to promote growth and development for both the pre-service teacher and the mentor teacher. This is supported by Phillips and Condy's (2023) findings that giving pre-service teachers concrete, hands-on opportunities to apply educational theory can narrow the theory-practice gap. Taking Kolb's theory of experiential learning into account, it can be argued that the use of LEGO® Six Bricks® as a resource in the classroom not only effectively engages pre-service teachers to reflect and experiment with their teaching approach and transform abstract knowledge into practical skills. Although five of the six participants completed the level 1 LEGO® Six Bricks® training before their teaching practice placement, they still managed to conceptualise their own activities that was contextual to the classroom they were placed in, rather than merely duplicate examples there were exposed to during the training. This was especially important because the class sizes and context in which they were placed, were so diverse. It was also indicative of their growing confidence in their own abilities and pedagogy. Tools like the Six Bricks® function as a form of situational learning, helping pre-service teachers to learn by doing and adapting as they reflect on their practice.

Exposure to play-based learning and using Six Bricks as a resource, also empowered them to address challenges they typically experience during school-based placements. Several challenges were successfully addressed, including building rapport with the learners and especially with the mentor teacher. Engaged involvement from the mentor teacher resulted in a more successful teaching practice experience. Having a positive relationship provides a platform where the apprenticeship of observation can be acknowledged and deconstructed. This, in turn, promotes the development of the professional identity of the pre-service teacher.

Classroom management and curriculum implementation and differentiation seem to be omnipotent challenges during teaching practice placements. This study showed that introducing a new resource that can be utilised over various domains of the teaching landscape mitigates some of those challenges. The identified themes shows integration and progression of praxis throughout: participants report initially using the Six Bricks® as a resource for classroom management and even for entertainment. As they became more proficient and confident, they progressed to utilising it as a teaching resource and for curriculum implementation across different subjects. Some also managed to become aware of the challenge of differentiation and meeting the needs created by inclusive education in a mainstream classroom.

Lastly, some participants discussed using the Six Bricks® for formative assessment, thereby progressing to using it not only as a tool for learning but also for the assessment of learning. After the school-based placement, our reflective group conversations even provided a safe space for assessment as learning. It is thus evident that this resource was successful in fostering professional development, improvements in pedagogy and promoting reflective practice. It was clear that using the resource enhanced various levels of their own pedagogy and philosophy. They started analysing best practice, rather than simply enacting what they were taught at university, what they saw from the mentor teacher or what their apprenticeship of observation dictated. This implied a direct evaluation of their own pedagogy.

Recommendations

A limitation of this study was that, due to the action research nature of the project, only six participants shared their experiences. These findings cannot be generalised to all pre-service teachers, and all mentor teachers will most definitely not react in similar ways. The contribution of this article does, however, lie in a holistic approach towards the lessons learned and the subsequent recommendations that can be made.

It is important to note that the findings might be relevant to LEGO® Six Bricks® in this unique context, but the lessons learned can be applied to the use of many other resources and play-based pedagogical strategies. In that light, the following recommendations can be made for teacher educators wishing to better utilise resources and school-based placement to address challenges typically faced during teaching practice:

- Initial preparation is crucial when planning play-based lessons.
- Creating awareness to the apprenticeship of observation and guidance for pre-service teachers to not only realise that they may fall back on how they were taught but be able to identify it and make a conscious dissection to try new approaches.
- Teachers should be adequately trained and familiar with the resources before they experiment with it.
- Create a safe space for risk and even failure, for both the children and the pre-service teachers.
- Constantly remind that not all resources will be efficient. The personality of the teacher, etc plays a role.
- Encourage pre-service teachers to critically examine their own practice.
- Development of soft skills of pre-service teachers and how to facilitate and support learners.
- Facilitate the integration of theory and practice and, by doing so, bridge the theory-practice gap.

Conclusion

This study sheds light on the lived experience of six pre-service teachers who were willing to risk a new pedagogical approach and a resource they were not familiar with. An experiential learning approach enveloped within an action learning methodology, created a space where they could not only optimise their teaching practice placement but also develop their own skills to critically consider context, teaching and their idea of best practice. It is clear that a valid effort was made to bridge both the theory-practice gap and the belief-practice gap most pre-service teachers report experiencing. The participants managed to transcend the initial linear use of the resource towards a dynamic and contextual tool to address challenges they and other pre-service teachers experience during school-based placements and in doing so even had mentor teachers learn from their experimentation.

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