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Promoting family engagement: computer-based simulations and teacher preparation

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ABSTRACT

The aim of the study is to investigate the impact of embedding the computer-based 'Parent, Family, and Community Engagement Simulation Series' within teacher education curricula in higher education institutions in the US and in Spain. A quantitative survey design was used to explore student teachers' perceptions of the simulation experience. The sample consisted of 95 undergraduate education students from Chicago State University (US) and Universidad Rey Juan Carlos (Spain). Participants attended a session where they played a 21-34-minute simulation, and afterwards completed an online questionnaire. As a result of the study, it was found that the simulation helps students learn strategies to promote family engagement and deepen their knowledge to promote positive, goal-oriented relationships with families. Based on the results, it can be asserted that the simulation also supports student teachers' in-depth learning when practicing active listening skills and relationship-building strategies.

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Introduction

Improving the quality of early childhood education and care (ECEC) is essential because it affects the everyday experience of young children (Mathers, Singler, and Karemaker 2012) and set the foundations for children's development (European Commission 2014). While the quality of schools matters significantly (Paz-Albo2018b)research shows that early parental engagement is critical for children's development and growth (Hiatt-Michael 2005; McWayne et al. 2004; Weiss, Caspe, and Lopez 2008). Increasingly, researchers are also recognising the importance of establishing strong partnerships with parents in the foundation years (Lindeboom and Buiskool 2013) since some of the child's most important cognitive development happens during those years. Moreover, recent calls to improve these quality experiences in children's education have drawn attention to the importance of teachers' preparation for working with families (Mathers, Singler, and Karemaker 2012; Paz-Albo 2018a).

Teachers need to work in close collaboration with parents to better support children's development and learning (Arikan, Fernie, and Kantor 2017). Family engagement is considered as a key practice principle for professionals working in ECEC (DCSF 2008;

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Rouse 2012), and a shared responsibility of professionals and families (National Center on Parent, Family, and Community Engagement 2018). Yet, as the Early Childhood Learning and Knowledge Center (Early Childhood Learning & Knowledge Center 2018) points out it is not only a collaborative process but a strengths-based one through which educators, children and families build goal-oriented and positive relationships that 'supports the parent–child relationships that are central to a child's healthy development, school readiness, and well-being'. Additionally, some national guidelines on ECEC curriculum stress the importance of increasing parental involvement 'to spot potential areas that require additional attention' (Lindeboom and Buiskool 2013, 18). However, this shift from a child-centred to family-centred practice may be challenging for some teachers, especially for prospective ECEC teachers.

The importance of parental engagement in teacher education

Despite evidence of the impact of parental involvement on children's learning and development (DCSF 2008; Castro et al. 2015), it seems initial teacher education programmes (ITE) do not prepare thoroughly enough their future teachers for such an important work (De Bruïne et al. 2014; Epstein 2013). In fact, pre-service teachers' preparation for family–school partnerships (FSP) in ITE is still a challenge (Willemse et al. 2018). Furthermore, research suggests that the preparation of future teachers to conduct effective parental engagement practices is most needed (Epstein and Sanders 2006). But, the challenge for them is to "learn *how* to implement research-based practices that will engage their own students' families in ways that contribute to student learning and development" (Epstein 2013, 115).

A swathe of country variations in FSP preparation for pre-service teachers at governmental and ITE programmes, reported by Thompson et al. (2018), cast doubt on an effective way of addressing parental engagement issues within ITE. Moreover, cross-nation studies suggest a lack of attention to pre-service teacher preparation for FSP (Gomila, Pascual, and Quincoces 2018; Epstein 2013; Willemse et al. 2016) due to reasons such overload ITE programmes and the lack of time and opportunity available within the ITE curriculum (Mutton, Burn, and Thompson 2018). Although questions persist, such as how to best prepare pre-service teachers for FSP, research suggests that most FSP preparation depends on the proclivities, expertise and actions of individual teacher educators (Lehmann 2018; Thompson et al. 2018; Walker and Legg 2018).

Overall, as Evans (2013) suggests teacher education can make a difference and increase pre-service teachers' confidence in ability to work and create strong connections with families. However, simply providing student teachers with information about the importance of family engagement does not necessarily improve their attitudes and assumptions about how to work best with young children and their families. Pre-service teachers need to practice and develop their skills in cooperation to work effectivity (Alanko 2018). Consequently, teacher educators could introduce new methodologies to ensure that student teachers engage in deep learning and gain a better understanding of family's behaviour. Given college students are pursuing degrees in early childhood education, little is known about how digital simulations could influence the ways students are prepared to promote one of the major factors in students' success, i.e. family engagement. Therefore, the current study aims at using simulation-based learning as a technique to

stimulate support and engage prospective teachers so they can identify good practice and improve family engagement outcomes. It is hoped that the findings of this study will help prospective teachers to develop strong relationships with families and inform teacher educators about the use of digital simulations to enhance school family engagement.

Simulation-based learning in teacher education

Higher education curricula are undergoing a change since the last decades where the main teaching methodology included classroom lecture and discussion. New technologies are challenging traditional teaching and learning models in higher education, and students are becoming reticent to participate actively in the classroom (Hitchens and Tulloch 2018). However, a critical objective in the higher education arena is to ensure that students are exposed not only to theoretical frameworks but also to real-world situations where they can gain experience in applying their knowledge. A teaching methodology that aligns with this educational goal is the use of digital simulations that replicate real-world situations in a more immersive and interactive approach (Hernández-Ramos et al. 2019; Vlachopoulos and Makri 2017).

Simulations contribute to the learning process, particularly in transferring learning from the conceptual base to its ultimate application (Sottile and Brozik 2004). As Duke, the founder of simulation and gaming as a scientific discipline, pointed out simulation is 'a conscious endeavour to reproduce the central characteristics of a system in order to understand, experiment with, and/or predict the behaviour of that system' (as quoted in Badiee and Kaufman 2015, 2). In fact, the use of simulations has been revealed to have many advantages in adult education (Jones, Passos-Neto, and Bragiroli 2015). According to De Bruïne et al. (2014), pre-service teachers could benefit from simulated parent-teacher conferences to develop partnership skills, practice and foster their communication competences (Walker and Legg 2018; see also De Coninck, Valcke, and Vanderlinde 2018 for an instrument to measure student teachers' parent-teacher communication competences) and deepen their knowledge about effective family involvement practices (Epstein and Sanders 2006). This body of research has shown the importance of improving pre-service development concerning FSP (Willemse et al. 2018). In fact, as Walker and Legg (2018) suggest simulated parent-teacher conferences can be integrated into teacher preparation programmes to "foster candidates' conference communication skills; assess their understanding of content knowledge and their ability to plan instruction" (366) and therefore develop strong FSP that will contribute to students' performance in school (Epstein 2011). Further, the integration of a simulation pedagogy in higher education to support FSP can support prospective teacher development and impact professional readiness (Walker and Legg 2018). However, as Gerich and Schmitz (2016) note the requirements of simulation contexts can make prospective teachers react immediately to the simulated interaction with parents and do not consider their responses when dealing with challenging scenarios.

In recent years research has shown that virtual-learning environments in teacher education programmes such as digital simulations may provide an effective learning context (Paz-Albo 2018a; Shah, Foster, and Barany 2017), and they may be an essential asset when face-to-face interactions are limited in a post-pandemic world. In fact, as De

Coninck et al. (2019) suggest simulation-based learning environments offer rich contexts for FSP. Further, simulation can replicate significant aspects of the real world, such as replacing and amplifying real experiences in an effusively interactive manner (Jones, Passos-Neto, and Bragiroli 2015) within a simulation environment (see De Coninck et al. 2019 for a description of a design framework to construct simulation-based learning environments). The introduction of digital simulations within ITE programmes may overcome the potential pressure of time and enables pre-service teachers to observe actual behaviour, experiment with different strategies, reflect and examine the consequences of their choices when interacting with families in a controlled virtual environment. Although the field of digital simulations is ever maturing, research shows that digital simulations have a positive impact on learning achievement (Vlachopoulos and Makri 2017). These outcomes might translate into a transformative learning experience. However, as Vlachopoulos and Makri (2017) further argue the effect of digital simulation on learning outcomes seems to be a controversial issue and there remains much work to be done. Despite this, and in addition to the numerous researchers interested in this field, educators consistently recognise and value pedagogical approaches and new methods in teacher education. The aforementioned research establishes that digital simulations can play important roles in preparing prospective teachers for FSP. Thus, ITE programmes need to consider the importance of further supporting student teachers in developing successful and collaborative relationships with families using digital simulations. In addition, through self-reflective practice student teachers can explore strategies that shift to a family-centred practice to strengthen teacher-family connections (Jor'Dan, Wolf, and Douglass 2012). Therefore, it is important for teacher educators to recognize the value of providing opportunities to explore new practices, problem solve and practice new ways of interacting with families in a safe environment, making use of simulated environments (see De Coninck et al. 2019 for a pilot implementation of face-to-face and computer-based simulations). Simulations are powerful resources that can be tapped into to connect families and teachers by replicating scenarios that are difficult to create in the real world and facilitate prospective teachers to prepare for these before they experience them in real-world situations.

In addition, some institutions are exploring the use of virtual simulations as the means to provide real-world experiences (McGarr 2020) that will support prospective teachers in developing empowering relationships with families. In a learning environment characterised by student's enactment of player roles, educators are no longer the sole source of feedback. Furthermore, effective feedback practices can significantly improve student performance (Australian Institute for Teaching and School Leadership 2017), and teacher educators need to understand which strategies support learning and stimulate improved learning to contribute to higher education student engagement. As Sambell (2011) notes, it is essential to help higher education students to identify gaps in their current knowledge and support them to undertake learning independently so they can tackle the complex global challenges ahead. In fact, virtual worlds may promote learners' knowledge since they immerse students in an individual-environment interaction (Shah, Foster, and Barany 2017) providing a personalised and diverse learning scenario (Paz-Albo 2017). In fact, simulation techniques have been used as training and feedback tools for many years in occupations such as medicine, aviation, military training and large-scale investment real-world practice that is dangerous, costly or difficult to organise (Badiee and

Kaufman 2015). However, the use of digital simulations within ITE programmes is still in its infancy.

In light of the current efforts being made to improve the field of teacher education, it continues to be a challenge to find ITE programmes that place digital simulation practices front and centre of actual university classroom setting. As Vlachopoulos and Makri (2017) suggest teacher educators need to take a more active role in introducing innovative technological tools. However, the introduction of innovative teaching methods such as the implementation of digital simulations into teacher preparation on FSP may work in one cultural context but not necessary in another cultural context, and far more teacher educator collaboration (see Kitchen, Berry, and Russell 2019 for a review of the power of collaboration) is needed to explore the ways in which digital simulations may enhance prospective teachers learning experiences on FSP. For this reason, an international research collaboration was created between teacher educators from Universidad Rey Juan Carlos (Spain) and Chicago State University (US). Both universities offer undergraduate studies (240 and 123 credit hours, respectively) designed to teach pre-kindergarten, kindergarten and the primary years so teacher educators could easily implement the use of digital simulations in their courses. Besides, in both countries, collaboration with parents is legally required in spite of some cultural differences in teacher preparation programmes (see Garvis et al. 2021 for a global perspective of parental engagement), providing us with insights from an international perspective. Therefore, the present research examines whether the computer-based 'Parent, Family, and Community Engagement (PFCE) Simulations Series', designed by the National Center on Parent, Family, and Community Engagement (NCPFCE), can be effectively integrated into the teacher education curriculum of two higher education institutions, one in Spain and another in the United States to (1) investigate pre-service teachers' beliefs towards the relevance of using the online PFCE simulation, and (2) to promote awareness on the importance of FSP.

Methodology

A quantitative survey design was used to investigate pre-service teachers' perceptions towards the use of an educational digital simulation in higher education settings to develop their family engagement competencies at two public universities located in Madrid (Spain) and Chicago (US). Data were collected using an online questionnaire via www.encuestafacil.com as the technology provider (powered by encuestafacil.com) immediately after the students played one of the four computer-based PFCE simulations. These PFCE simulations are based on the PFCE Framework published in 2011 by the US Office of Head Start, Administration for Children and Families to implement programme performance standards for PFC engagement.

Participants

The participants were selected using a convenience sampling technique, and all students who attended the PFCE session within the scope of an education course for prospective teachers in the teacher education departments at the Universidad Rey Juan Carlos (URJC) and Chicago State University (CSU) during the month of December 2017 were invited to

participate in this study. The total sample consisted of 95 prospective teachers (86 females and 9 males) who studied primary and early childhood education courses ranging in age from 17 to 56 years ($M = 21.92$, $SD = 6.34$). The presence of a greater number of female prospective teachers reflects the early childhood education field, in which 95.7% of all teachers are women (Roca et al. 2019).

Instruments and procedure

All participants played one of the four computer-based PFCE simulations, which included a virtual Head Start/Early Head Start/Early Childhood centre where they would assume the role of a staff member. Each session (see Figure 1) began with a 4-6-minute description of the PFCE simulation during which student teachers were provided with a description of the simulated environment so they could decide which simulation to play (see Early Childhood Learning & Knowledge Center 2020 to access the specifics for each online simulation). Afterwards, the instructors asked the participants to read the simulation summary for their selected simulation (see Early Childhood Learning & Knowledge Center 2020 to read each simulation summary). These simulation summaries, provided by the NCPFCE, contained information regarding diverse strategies and communication techniques for partnering with families and pitfalls to avoid in conversations with families. After the completion of the 21-34-minute digital simulation they could volunteer to participate in a research survey. To ameliorate the potential bias of student teachers reporting what they thought their instructors wanted to hear, participants were provided

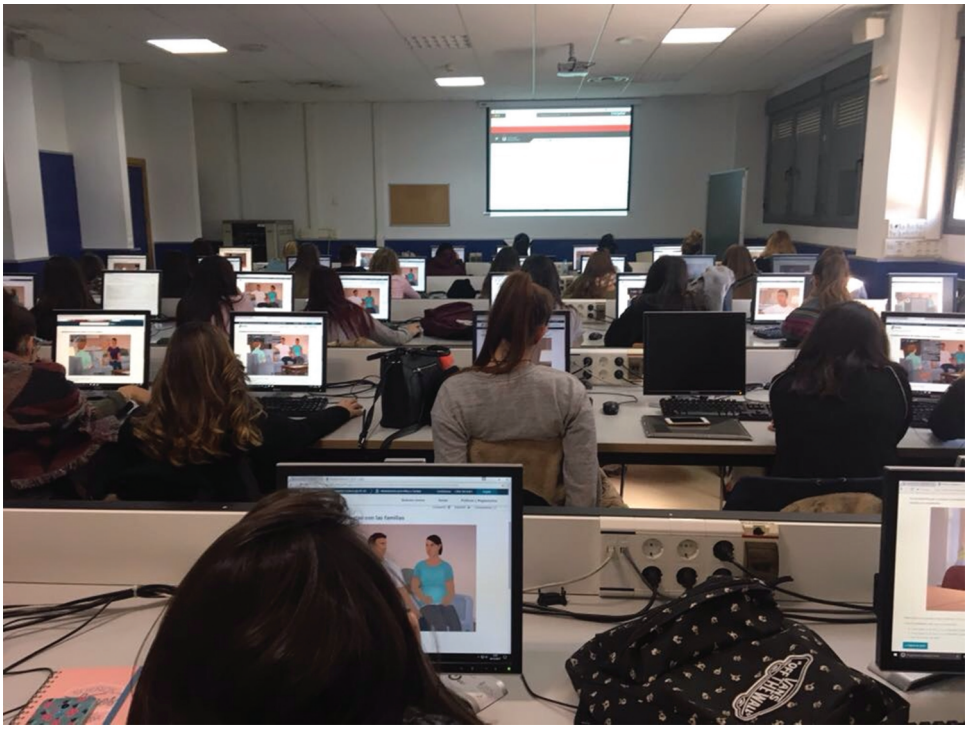

Figure 1. Students interacting with the PFCE simulation in the URJC computer laboratory.

Table 1. Computer-based simulation selection of CSU and URJC student teachers.

PFCE Simulation	Language	CSU (n = 12)	URJC (n =83)	Total (N = 95)
(1) Engaging families from the start	English	10	0	10
	Spanish	0	0	0
(2) Goal setting with families	English	1	6	7
	Spanish	0	54	54
(3) Starting with strengths in challenging times	English	0	0	0
	Spanish	0	18	18
(4) Relationship-based practices: talking with families about developmental concerns	English	1	0	1
	Spanish	0	5	5

with an online survey link where they were informed about the study and their right to withdraw for participating at any time, so they could make an informed decision on whether to participate. Additionally, participants characteristics, including age, sex and degree programme enrolment were collected at the beginning of the questionnaire but no other data that could identify the respondent to guarantee the anonymity of the recipient's response to the surveys and ensure confidentiality.

The study design minimised several threats to validity since student teachers could play not only the computer-based simulation of their choice but the language of the simulation as well (see Table 1). Additionally, the survey instrument was adapted from previous research (Paz-Albo 2018a), reviewed and pilot tested by a group of teacher

Table 2. Group differences between CSU and URJC students.

	CSU (n = 12)		URJC (n = 83)		TOTAL (N = 95)		
Likert-scale items	*M*	*SD*	*M*	*SD*	*M*	*SD*	*t* (93)
(1) Using the Simulation helps me to deepen my knowledge of parent, family, and community engagement.	4.67	.49	4.11	.81	4.18	.80	2.32*
(2) Using the Simulation helps me learn specific strategies for parent, family, and community engagement.	4.75	.45	4.19	.69	4.26	.69	2.71*
(3) Using the Simulation helps me learn strategies for developing positive, goal-oriented relationships with families.	4.83	.39	4.22	.70	4.29	.70	4.53**
(4) Using the Simulation helps me learn ways to observe a child's behavior as a way to open up communication with families.	4.75	.45	3.77	.95	3.89	.96	3.49***
(5) Using the Simulation helps me learn ways to practice active listening with families.	4.75	.45	4.13	.81	4.21	.80	2.58*
(6) Using the Simulation helps me learn ways to encourage families to share information, thoughts, ideas, and beliefs about their child.	4.75	.45	4.07	.79	4.16	.79	2.89*
(7) Using the Simulation helps me learn ways to support parents' competence.	4.67	.49	4.05	.76	4.13	.76	2.72*
(8) Using the Simulation helps me identify barriers to parent, family, and community engagement.	4.67	.49	4.10	.74	4.17	.74	2.57*
(9) The Simulation identifies strategies for developing positive, goal-oriented relationships with families.	4.67	.49	4.19	.76	4.25	.74	2.10*
(10) The Simulation demonstrates the use of relationship-building strategies.	4.58	.67	4.04	.88	4.11	.87	2.08*
(11) The Simulation provides the opportunity to practice using relationship-building strategies.	4.58	.67	4.07	.79	4.14	.79	2.12*
(12) The Simulation is representative of typical interactions in Early Childhood Education Institutions.	4.58	.67	3.82	.81	3.92	.83	3.10*
(13) The Simulation is appropriate for my skill level, education, and experience.	4.58	.67	3.84	.89	3.94	.90	2.76*
(14) The Simulation is appropriate for my future role as an educator.	4.58	.52	4.23	.83	4.27	.81	1.43*

*$p < .05$. *** $p = .001$. **$t(22.99)$, $p < .001$.

educators and revised by the primary investigators. The final version of the questionnaire consists of 21 items: three biographical information items, 14 items (see Table 2) rated on a 5-point Likert scale from (1) strongly disagree to (5) strongly agree, two closed-ended and two open-ended items, asking participants to describe what they found most and least useful about the simulation.

Data analysis

A reliability analysis was carried out comprising the 14 scale items, and Cronbach's alpha showed the questionnaire has a very good internal consistency ($\alpha = .95$). Further, preliminary analyses were conducted to check whether the higher education institution or the computer-based simulation choice had significant effects on any of the results. We conducted an ANOVA, as well as a series of independent *t*-tests, correlation tests and Fisher's exact tests in a manner to prepare appropriate interpretations on the perceptions of CSU and URJC student teachers. The SPPSS version 25.0 was used for analyses.

Findings

Student teachers' perceptions towards the use of the digital simulation are highly positive (see Table 2). One preliminary analysis examined the effects of simulation choices variables (simulation) and higher education variables (university) for all the Likert-scale questions and closed-ended questions. A two-way ANOVA with 2 (university) × 6 (simulation) between-subject factors showed no statistically significant effect (all $p > .05$), thus allowing us to collapse our results across these factors. Further follow-up ANOVA analyses showed that student teachers' perceptions towards the simulation experience did not differ significantly.

It is important to note that though no significant differences ($p > .05$), overall difference was initially found. As seen in Table 2, the mean scores of the CSU group are slightly higher than that of the URJC group. Additionally, the assumption of homogeneity of variances were tested and satisfied via Levene's *F* test, except for item 3. Independent-samples *t*-tests were conducted to determine whether any significant difference in the mean scores could be observed for the two groups. When comparing student teachers' responses, results showed that USC students were more positive compared to the URJC students, being associated with a statistically significant effect (see Table 2).

Overall, participants beliefs (see Table 2) suggest the PFCE simulation enhanced their learning by deepening their knowledge of PFCE ($M = 4.18$, $SD = .80$), and helped them learn specific strategies on how to promote family engagement within the education context ($M = 4.26$, $SD = .69$) and develop positive, goal-oriented relationships with families ($M = 4.29$, $SD = .70$). Further, the simulation helped participants to observe a child's behaviour as a means to open up communication with families ($M = 3.89$, $SD = .96$) and practice active listening skills with families ($M = 4.21$, $SD = .80$). Results also indicate that the simulation assisted prospective teachers in learning how to encourage communication with families ($M = 4.16$, $SD = .79$), support parenting competence ($M = 4.13$, $SD = .76$) and identify challenges to PFCE engagement ($M = 4.17$, $SD = .74$).

On the other hand, the use of the PFCE simulation is perceived, by most student teachers, as a tool that not only identifies strategies for developing positive, goal-oriented

relationships with families ($M = 4.25$, $SD = .74$), but also demonstrates how to use those relationship-building strategies ($M = 4.11$, $SD = .87$) so participants can practice them as they interact with the simulation ($M = 4.14$, $SD = .79$). In fact, the participants strongly believe that the PFCE simulation has played a key role in their training as future teachers ($M = 4.27$, $SD = .81$). Above presented results provided answer to the first research question.

Fisher's exact tests of independence were used to identify differences in prospective teachers' responses on their beliefs about (a) the inclusion of simulations in teacher education programmes, and (b) the use of the PFCE simulation as a means to promote student engagement in learning. In this study, Fisher's exact test is used to observe differences between the samples of the CSU group ($n = 12$) and the URJC group ($n = 83$). They offer an appropriate test because of the small-sized samples, and the variables of interest for both close-ended questions were categorical. Although the results neither show any significant differences ($p > .05$), most participants believe simulations such as the PFCE simulation promotes student engagement in learning (94.7%) and they should be included in teacher preparation programmes (93.7%).

Additionally, when asked what they found most useful about the PFCE simulation in one of the open-ended questions, student teachers showed a positive impact in their outcome from the use of simulation for prospective teacher preparation. According to participants, 'the simulation was very engaging' and provide them 'great information to improve [their] communication skills with parents'; it also 'encouraged students to learn' and 'to be active listener[s] with families' by reflecting and 'pick choices and engage with parent [themselves]' when interacting with the computer-based simulation. Thus, allowing prospective teacher 'to feel how it will actually be when talking with a parent about their child' so they can practice how to establish partnerships with families to support students learning and development. The computer-based simulation provided a form of hands-on learning and through this active participation students were able to apply theoretical concepts they were taught and indicated increased levels of knowledge. Above presented results provided answer to the second research question.

Although student teachers' views were strongly positive, when asked about what they found least useful about the simulation three students mentioned the PFCE simulation was lengthy, and 'it could have given [more] practice situations' and provide more scenario simulations to choose from. In addition, some students declared the simulation did not provide enough choices to choose from when interacting with the simulation and they sometimes felt they had repeated exposure to the same information.

Discussion and conclusion

The purpose of this study was to test whether the use of the computer-based PFCE simulation could be relevant for student teachers as future early childhood and primary educators since it could increase their awareness on the importance of family engagement. Our findings reveal that the majority of participants stated the representativeness of the PFCE simulation interactions and appropriateness for their future role as educators. Findings suggest the simulation promotes a positive mental attitude in prospective teachers that is essential for effective learning (as found by Hitchens and Tulloch 2018) and helps them develop cognitive abilities that promote in-depth learning (as found by

Vlachopoulos and Makri 2017). Such practices, it is argued, position simulations as an active learning technique for improving student's knowledge, understanding and application of theoretical material in real-life situations (Harris and Welch 2019), making learning more accessible, relevant and engaging for prospective educators.

Similar to previous studies (Paz-Albo 2018a, this study found that the PFCE simulation helps student teachers learn strategies to enhance positive, goal-oriented relationships with families. Further, the simulation also supports participants' learning when practicing active listening skills and relationship-building strategies. In particular, playing the PFCE simulation can be seen as an educational intervention which can help student teachers to acquire important skills and apply them to real-world scenarios, as other reality-based simulation games that enhance students' knowledge (Vlachopoulos and Makri 2017).

These results generally confirm the finding from previous studies regarding the effectiveness of improving learning outcomes of a more active and experiential learning (Hummel et al. 2011; Merchant et al. 2014), and they provide encouraging evidence to support the use of simulations as a teaching methodology within the field of education which may lead to the enhancement of student teachers' performance and preparation to effectively engage families. Furthermore, educational engagement is one of the key ingredients in students' academic success (Paz-Albo 2014) and using simulations such as the PFCE simulation can support increased use in teacher preparation programmes. This indicates potential benefits in using a simulation-based education to increase prospective teachers' competencies as it relates to family engagement and other content areas. In fact, the increased power of interactive simulations over the learning process have broad application in contributing to more supportive designs for learning environments in which tertiary students may acquire knowledge and skills across disciples or subject areas (Vlachopoulos and Makri 2017), and increasing their cognitive gains, albeit more effectively than traditional teaching methods (Vogel et al. 2006).

Additionally, these findings have practical implications for teacher preparation programmes and should be taken into consideration by future studies that examine the use of computer-based simulations and the benefits of simulation-based practice including pedagogy related to teacher preparation in family engagement. It has been illustrated that student teachers benefit from embedding this interactive learning methodology, even if they had repeated exposure to scenario simulations since they may enhance the performance level of students (Abe et al. 2013; Tofil et al. 2014). In line with Paz-Albo (2018a), digital simulations appear to be a useful way to foster student teachers' awareness and learning experiences through artificial environments (Gibson and Baek 2009). Although the effectiveness of simulations for teacher education and training in still unclear, introducing the use of such simulation in more ITE programmes could potentially allow to assess its efficacy from a broader experiential domain to serve both the demands of education and the professional preparation of teachers. There is no one right teacher education simulation pedagogy for all ITE institutions everywhere at all times.

As teacher educators, we must work together to strengthen standards that would ultimately provide all student teachers with high-quality training and take interactive simulations components into consideration. Furthermore, more large-scale collaborative work between teacher educators and researchers is needed to explore the ways in which these simulations may prepare effective teachers to address issues such as FSP in a more

meaningful way within ITE programmes. However, simulations' implementation is influenced by teacher educators' motivation (Vlachopoulos and Makri 2017) and further research is needed to better understand the benefits and assess the feasibility of embedding such simulations in the ITE curriculum.

Limitations

Although this study provides valuable insight for teacher educators related to pre-service teacher training, subsequent research will address several limitations. One limitation is our small sample of student teachers from only two universities. However, our aim was to gain insights into the implementation of the PFCE simulation in diverse teacher preparation programmes and the voluntary response sample was intended as exploratory rather than generalisable to the entire population of prospective teachers. Therefore, additional studies should focus on a multi-site collaboration on the basis of a larger more balanced sample of pre-service teachers. The participants in the study were intentionally selected through purposeful sampling and might be considered biased. Another note of caution is the results obtained in this study could be the effect of the PFCE simulation implementation, and perceptions could be different in broader contexts. More research is proposed to explore ways in which computer-based simulation for pre-service teachers can be integrated into ITE institutions. Mixed-method research is also needed to better understand the views of student teachers and explore the benefits of immersing participants in diverse reality-based simulations for a longer period of time throughout the year and as a part of the curriculum, but that can be done on a further research.

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References

Abe, Y., C. Kawahara, A. Yamashina, and R. Tsuboi. 2013. "Repeated Scenario Simulation to Improve Competency in Critical Care: A New Approach for Nursing Education." *American Journal of Critical Care* 22 (1): 33–40. doi:10.4037/ajcc2013229.

Alanko, A. 2018. "Preparing Pre-Service Teachers for Home-School Cooperation: Exploring Finnish Teacher Education Programmes." *Journal of Education for Teaching* 44 (3): 321–332. doi:10.1080/02607476.2018.1465644.

Arikan, A., D. Fernie, and R. Kantor. 2017. "Supporting the Professional Development of Early Childhood Teachers in Head Start: A Case of Acquiring Technology Proficiency." *Elementary Education Online* 16 (4): 1829–1849. doi:10.17051/ilkonline.2017.342996.

Australian Institute for Teaching and School Leadership. 2017. "Spotlight. Reframing Feedback to Improve Teaching and Learning." Accessed 13 April 2018. https://www.aitsl.edu.au/docs/default-source/research-evidence/spotlight/spotlight-feedback.pdf

Badiee, F., and D. Kaufman. 2015. "Design Evaluation of a Simulation for Teacher Education." *SAGE Open* 5 (2): 1–10. doi:10.1177/2158244015592454.

Castro, M., E. Expósito-Casas, E. López-Martín, L. Lizasoain, E. Navarro-Asencio, and J. L. Gaviria. 2015. "Parental Involvement on Student Academic Achievement: A Meta-Analysis." *Educational Research Review* 14: 33–46. doi:10.1016/j.edurev.2015.01.002.

DCSF. 2008. *The Impact of Parental Involvement on Children's Education*. DCSF Publications. Accessed 27 April 2020. https://www.ucy.ac.cy/nursery/documents/ThemaVdomadas/DCSF-Parental_Involvement_1.pdf

De Bruïne, E. J., T. M. Willemse, J. D'Haem, P. Griswold, L. Vloeberghs, and S. van Eynde. 2014. "Preparing Teacher Candidates for Family–School Partnerships." *European Journal of Teacher Education* 37 (4): 409–425. doi:10.1080/02619768.2014.912628.

De Coninck, K., M. Valcke, I. Ophalvens, and R. Vanderlinde. 2019. "Bridging the Theory-Practice Gap in Teacher Education: The Design and Construction of Simulation-Based Learning Environments." In *Kohärenz in der Lehrerbildung*, edited by K. Hellmann, J. Kreutz, M. Schwichow, and K. Zaki, 263–268. Wiesbaden: Springer.

De Coninck, K., M. Valcke, and R. Vanderlinde. 2018. "A Measurement of Student Teachers' Parent-Teacher Communication Competences: The Design of a Video-Based Instrument." *Journal of Education for Teaching* 44 (3): 333–352. doi:10.1080/02607476.2018.1465656.

Early Childhood Learning & Knowledge Center. 2018. "Family Engagement." Accessed 10 May 2018. https://eclkc.ohs.acf.hhs.gov/family-engagement

Early Childhood Learning & Knowledge Center. 2020. "Parent, Family, and Community Engagement Simulation: Boosting School Readiness Through Effective Family Engagement Series." Accessed 2 May 2020. https://eclkc.ohs.acf.hhs.gov/family-engagement/article/parent-family-community-engagement-simulation-boosting-school-readiness-through-effective-family

Epstein, J. L. 2011. *School, Family, and Community Partnerships: Preparing Educators and Improving Schools*. New York: Routledge.

Epstein, J. L. 2013. "Ready or Not? Preparing Future Educators for School, Family, and Community Partnerships." *Teaching Education* 24 (2): 115–118. doi:10.1080/10476210.2013.786887.

Epstein, J. L., and M. G. Sanders. 2006. "Prospects for Change: Preparing Educators for School, Family, and Community Partnerships." *Peabody Journal of Education* 81 (2): 81–120. doi:10.1207/S15327930pje8102_5.

European Commission. 2014. *Proposal for Key Principles of a Quality Framework for Early Childhood Education and Care. Report of the Working Group on Early Childhood Education and Care Under the Auspices of The European Commission*. Brussels: European Commission.

Evans, M. P. 2013. "Educating Preservice Teachers for Family, School, and Community Engagement." *Teaching Education* 24 (2): 123–133. doi:10.1080/10476210.2013.786897.

Garvis, S., P. Sivanes, H. Harju-Luukkainen, and A. Renata, eds. 2021. *Parental Engagement and Early Childhood Education Around the World*. New York: Routledge.

Gerich, M., and B. Schmitz. 2016. "Using Simulated Parent-Teacher Talks to Assess and Improve Prospective Teachers' Counseling Competence." *Journal of Education and Learning* Education and Learning 5 (2): 285–301. doi:10.5539/jel.v5n2p285.

Gibson, D., and Y. Baek, eds. 2009. *Digital Simulations for Improving Education: Learning Through Artificial Teaching Environments*. Hershey, NY: Information Science Reference.

Gomila, M. A., B. Pascual, and M. Quincoces. 2018. "Family-School Partnership in the Spanish Education System." *Journal of Education for Teaching* 44 (3): 309–320. doi:10.1080/02607476.2018.1465641.

Harris, N., and C. E. Welch. 2019. "Developing Cognitive Skills Through Active Learning: A Systematic Review of Health Care Professions." *Athletic Training Education Journal* 14 (2): 135–148. doi:10.4085/1402135.

Hernández-Ramos, P., C. M. Bachen, C. Raphael, J. Ifcher, and M. Broghammer. 2019. "Experiencing Poverty in an Online Simulation: Effects on Players' Beliefs, Attitudes and Behaviors About Poverty." *Cyberpsychology: Journal of Psychosocial Research on Cyberspace* 13 (3). article 1. doi:10.5817/CP2019-3-1.

Hiatt-Michael, D. B., ed. 2005. *Promising Practices for Family Involvement in Schooling Across the Continents*. Greenwich, CT: Information Age.

Hitchens, M., and R. Tulloch. 2018. "A Gamification Design for the Classroom." *Interactive Technology and Smart Education* 15 (1): 28–45. doi:10.1108/ITSE-05-2017-0028.

Hummel, H. G., J. Van Houcke, R. J. Nadolski, T. Van der Hiele, H. Kurvers, and A. Löhr. 2011. "Scripted Collaboration in Serious Gaming for Complex Learning: Effects of Multiple Perspectives When Acquiring Water Management Skills." *British Journal of Educational Technology* 42 (6): 1029–1041. doi:10.1111/j.1467-8535.2010.01122.x.

Jones, F., C. E. Passos-Neto, and O. F. M. Bragiroli. 2015. "Simulation in Medical Education: Brief History and Methodology." *Principles and Practice of Clinical Research* 1 (2): 56–63. doi:10.21801/ppcrj.2015.12.8.

Jor'Dan, J. R., K. G. Wolf, and A. Douglass. 2012. "Strengthening Families in Illinois: Increasing Family Engagement in Early Childhood Programs." *Young Children* 67 (5): 18–23.

Kitchen, J., M. Berry, and T. Russell. 2019. "The Power of Collaboration." *Studying Teacher Education* 15 (2): 93–97. doi:10.1080/17425964.2019.1628560.

Lehmann, J. 2018. "Parental Involvement: An Issue for Swiss Primary School Teacher Education." *Journal of Education for Teaching* 44 (3): 296–308. doi:10.1080/02607476.2018.1465626.

Lindeboom, G. J., and B. J. Buiskool. 2013. *Quality in Early Childhood Education and Care. Annex Report Country and Case Studies*. Brussels: Directorate General for International Policies, Policy Department B. Structural and Cohesion Policies. Culture and Education. Accessed 21 November 2019. http://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/495867/IPOL-CULT_ET2013495867ANN01_EN.pdf

Mathers, S., R. Singler, and A. Karemaker. 2012. *Improving Quality in the Early Years: A Comparison of Perspectives and Measures*. Oxford: Daycare Trust, Oxford University and A+Education.

McGarr, O. 2020. "The Use of Virtual Simulations in Teacher Education to Develop Pre-Service Teachers' Behaviour and Classroom Management Skills: Implications for Reflective Practice." *Journal of Education for Teaching* 46 (2): 159–169. doi:10.1080/02607476.2020.1724654.

McWayne, C., V. Hampton, J. Fantuzzo, H. L. Cohen, and Y. Sekino. 2004. "A Multivariate Examination of Parent Involvement and the Social and Academic Competencies of Urban Kindergarten Children." *Psychology in the Schools* 41 (3): 363–377. doi:10.1002/pits.10163.

Merchant, Z., E. T. Goetz, L. Cifuentes, W. Keeney-Kennicutt, and T. J. Davis. 2014. "Effectiveness of Virtual Reality-Based Instruction on Students' Learning Outcomes in K-12 and Higher Education: A Meta-Analysis." *Computers & Education* 70: 29–40. doi:10.1016/j.compedu.2013.07.033.

Mutton, T., K. Burn, and I. Thompson. 2018. "Preparation for Family-School Partnerships Within Initial Teacher Education Programmes in England." *Journal of Education for Teaching* 44 (3): 278–295. doi:10.1080/02607476.2018.1465624.

National Center on Parent, Family, and Community Engagement. 2018. *Head Start Parent, Family, and Community Engagement Framework*. 2nd ed. https://eclkc.ohs.acf.hhs.gov/sites/default/files/pdf/pfce-framework.pdf

Paz-Albo J. (2014). The impact of using smartphones as student response systems on prospective teacher education training: a case study. El Guiniguada, 10.20420/ElGuiniguada.2014.0066

Paz-Albo J. (2017). Is Personalized Learning the Future of School?. Childhood Education, 93(4), 295–299. 10.1080/00094056.2017.1343581

Paz-Albo J. (2018a). The influence of simulations on family engagement – prospective early childhood educators' perceptions. Early Child Development and Care, 188(2), 102–108. 10.1080/03004430.2016.1202946

Paz-Albo J. (2018b). Enhancing the quality of early childhood education and care: ECEC tutors' perspectives of family engagement in Spain. Early Child Development and Care, 188(5), 613–623. 10.1080/03004430.2017.1417272

Roca, E., J. Jiménez, Y. Zárate, A. S. Frías, M. A. Barrio, M. A. Collado, R. González-Albo, J. F. Gutiérrez, and J. Jiménez. 2019. *Informe 2020 Sobre el Estado Del Sistema Educativo. Curso 2018-2019*. Spain: Secretaría General Técnica.

Rouse, L. 2012. "Family-Centered Practice: Empowerment, Self-Efficacy, and Challenges for Practitioners in Early Childhood Education and Care." *Contemporary Issues in Early Childhood* 13 (1): 17–26. doi:10.2304/ciec.2012.13.1.17.

Sambell, K. 2011. *Rethinking Feedback in Higher Education: An Assessment for Learning Perspective*. Bristol: ESCalate. http://www.leeds.ac.uk/educol/documents/207321.pdf

Shah, M., A. Foster, and A. Barany. 2017. "Facilitating Learning as Identity Change Through Game-Based Learning." In *Game-Based Learning: Theory, Strategies and Performance Outcomes*, edited by Y. Baek, 257–278. New York, NY: Nova Publishers.

Sottile, J. M., and D. Brozik. 2004. "The Use of Simulations in a Teacher Education Program: The Impact on Student Development. A Critical Review." Paper presented at the Hawaii International Conference on Education, Hawaii, January 3-6.

Thompson, I., M. Willemse, T. Mutton, K. Burn, and E. De Bruïne. 2018. "Teacher Education and Family–School Partnerships in Different Contexts: A Cross Country Analysis of National Teacher Education Frameworks Across a Range of European Countries." *Journal of Education for Teaching* 44 (3): 258–277. doi:10.1080/02607476.2018.1465621.

Tofil, N. M., D. Taylor, J. Turner, A. Youngblood, J. Lyn, D. Lara, B. Jakaitis, J. Niebauer, and M. Lee. 2014. "Repeated versus Varied Case Selection in Pediatric Resident Simulation." *Journal of Graduate Medical Education* 6 (2): 275–279. doi:10.4300/JGME-D-13-00099.1.

Vlachopoulos, D., and A. Makri. 2017. "The Effect of Games and Simulations on Higher Education: A Systematic Literature Review." *International Journal of Educational Technology in Higher Education* 14 (1): 22. doi:10.1186/s41239-017-0062-1.

Vogel, J. J., D. S. Vogel, J. Cannon-Bowers, C. A. Bowers, K. Muse, and M. Wright. 2006. "Computer Gaming and Interactive Simulations for Learning: A Meta-Analysis." *Journal of Educational Computing Research* 34 (3): 229–243. doi:10.2190/FLHV-K4WA-WPVQ-H0YM.

Walker, J. M. T., and A. M. Legg. 2018. "Parent-Teacher Conference Communication: A Guide to Integrating Family Engagement Through Simulated Conversations About Student Academic Progress." *Journal of Education for Teaching* 44 (3): 366–380. doi:10.1080/02607476.2018.1465661.

Weiss, H., M. Caspe, and M. E. Lopez. 2008. "Family Involvement Promotes Success for Young Children: A Review of Recent Research." In *Promising Practices for Partnering with Families in the Early Years*, edited by M. M. Cornish, 1–20. Charlotte, NC: Information Age.

Willemse, T. M., I. Thompson, R. Vanderlinde, and T. Mutton. 2018. "Family-School Partnerships: A Challenge for Teacher Education." *Journal of Education for Teaching* 44 (3): 252–257. doi:10.1080/02607476.2018.1465545.

Willemse, T. M., L. Vloeberghs, E. J. De Bruïne, and S. Van. 2016. "Preparing Teachers for Family-School Partnerships: A Dutch and Belgian Perspective." *Teaching Education* 27 (2): 212–228. doi:10.1080/10476210.2015.1069264.