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Title: Simulated Professional Experiences in Initial Teacher Education

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Abstract: This is a report on a mixed methods research project into the emerging area of computer simulation in Initial Teacher Education (ITE). The attitudes of a group of ITE students towards the use of a specifically designed and recently developed simulation tool for teaching student skills and understanding in the area of 'working with other professionals' are explored. It emerges that students' attitudes towards computer simulation are complex and not based on single factors such as the look or fidelity of the presentation. Rather, they appear to reflect deep seated views of teaching and learning unrelated to simulation. Indications are that if future use of simulation is to be effective then designers must pay at least as much attention to emotional impact as cognitive development. Some brief discussion of the future direction of this work is offered.

Key Words: Simulation; Training; Computer; Teacher Education; Attitudes; Future; Emotion

1 - Context

Initial teacher education in the UK has gone through a rapid series of changes in the last thirty years and there is little indication that the pace of change is likely to let up. From the creation of CATE (the Council for the Accreditation of Teacher Education) in 1984, its transformation into the TTA (Teacher Training Agency) in 1994 and the requirement of OFSTED (Office for Standards in Education) to monitor the quality of courses in the same year, to the creation of a National Curriculum for ITE in 1996, there was one recurring theme – the desire of successive governments to move teacher training towards a more 'technicist', less academic or 'theoretical', basis (Blake & Hanley, 1998, Williams & Soares, 2002). Programmes such as SCITT (School Centred Initial Teacher Training) and GTP (Graduate Teacher Programme) and 'Teach First' over the last five years have continued this trend. The current UK coalition government is now committed to increasing the number of teachers trained 'in situ' (DfE, 2010)

The idea that teaching is a technical activity, leading to an ever increasing emphasis on practicum experiences in Initial Teacher Education (ITE), is a view that is shared by a majority of ITE students (Hobson, 2002) and this is a view that is apparently formed *before* exposure to actual ITE courses (Hobson & Tomlinson, 2001). Studies have consistently shown (Brooks, 2000; Brookes 2005; Burn et al, 2000; Cheng et al, 2009) that 'theory' or other faculty based activity is considered by ITE students to be much less important or unimportant in their training when compared to teaching practice experiences. Concurrent with this is the fact that students who place less value on what they learn outside the classroom are not often in a position to make effective use of what they do learn. (Eraut, 1994, Emery,1998). This can lead to a tension between what the students see as the 'important' aspects of the course and the perceptions of those running and delivering the course.

It is not surprising, then, that Higher Education Institution based ITE providers should look for ways to 'bridge the gap' between theory and practice by trying to find ways to make faculty learning seem to be more relevant to the students. One such method is the use of computer simulation and such an attempt is the focus of this article. The study described herein was concerned with student teachers' attitudes to a computer simulation designed to support the development of professional skills.

2 – Literature Review

Whilst it is usual to begin a literature review with the most up to date evidence, in this instance a brief history lesson is needed. In order to understand the use of simulation in ITE, one must go back to a time before the word 'virtual' became a generic term for all things 'computer'. Simulation as a tool for teacher education has its roots in the early 1960's. Tansey (1970) discussed several attempts to simulate the real world using 16mm projectors showing real incidents backed up with paper contextual information. A set of pre-defined expected responses was created and students given a numerical score based on their performance as part of the feedback. In this sense, the simulation was clearly being mainly used as an assessment tool to evaluate 'readiness' for the real world of the classroom. Students had been subjected to the usual methods of training (lectures, reading etc.) before hand and the simulation gave them the opportunity to demonstrate their newly acquired skills. In the modern world of formative feedback and assessment *for* learning strategies it seems strange to think that the simulation itself, via discussion, self-review and reflection and so on, did not form part of the actual training itself. Cruikshank and Broadbent (1968) used similar ideas to explore situations that occurred outside of the classroom, including disagreements at break time, students discussing personal problems etc., with scenarios presented and the question, 'What would you do in this situation?' being asked by the tutors.

It is no coincidence that the first recorded use of simulation in ITE in the UK comes at a time when the constructivist learning theories of people like Bruner and Piaget are at the forefront of educational practice. Constructivist theories, particularly social constructivist theories, underpin ideas about the importance of learning within a context. Simulations allow trainers to control the context within which the learning takes place in a way that random assignment to a teaching practice school does not.

Other approaches to simulation in Initial Teacher Education appear throughout the 1970's and early 1980's when the advent of the microcomputer led a few forward thinking teacher training institutions, particularly in the USA, to consider the application of computer technology to the form. Strang et al

(1989) report on several examples including Lunetta's (1977) interpersonal exchanges simulation and Varnhagen & McCann's (1981) behaviour management simulation. Baird & Koballa (1988) used a very basic simulation to try to increase pre-service teachers' hypothesising skills. Although they reported some success, the research was severely hampered by the fact that the available technology only allowed for hypothesising about mathematical functions when the intended learning related to scientific hypothesising. Of particular interest are Strang et al's (1989) series of simulations that used, for the time, cutting edge computer equipment to simulate pupil responses to classroom scenarios such as applying a spelling test. From this they were able to establish key features of their simulation that contributed to its reality for the students. In the reported research, students mention the ability to use feedback to improve on their performance as an important feature of the simulation.

In the field of teacher education, simulation appears to have become less fashionable over the last 10 years. A search of the recent literature related to ITE and computer simulation actually reveals very little. Much of the research is currently focussed on the use of Virtual Learning Environments and the adaptation of social networking and media software. An important exception to this is Ferry et al (2004) who found that pre-service teachers became heavily engaged with their simulation and reported that this had enabled them to develop their skills and reflect on their own beliefs. A key finding of the research was that several students recognised this as a 'safe' environment where they were free to make mistakes without any impact on real children. This ethical driver is a point worth emphasising as it is one that seems to be notably absent from the push towards more school based training of teachers. It is also a point that will be returned to later.

Whilst teacher educations have been relatively slow to embrace the use of computer simulation, the same cannot be said in the field of medical education (Rush et al, 2010). Bligh & Bleakley (2006) have used simulation with undergraduate and post-graduate medical students and present a simple model that may also be appropriate to ITE. They posit the idea of computer simulation as a '*bridging activity*' or '*third place between classroom and clinic*' (p609). This essentially sets the conceptual framework for the research being described herin. Another possibility is that students might see simulation more as a subset of classroom activity than as a bridging activity – in which case the use of simulation may not help to bridge the gap at all. It is also conceivable that the use of simulation may cause views of the divide to become entrenched as the activity may be perceived as 'pretending' to be a reality that it cannot hope to emulate. If this is the case then the use of simulation will do nothing more than give the students a better view of the faculty/practice divide – a reaffirmation of a pre-existing view that only in the trial and error approach of classroom practice can there be any real value.

This, then, is essentially the problem that is faced by those who would use computer simulation in ITE. Does it bridge the gap between faculty and practicum experiences? Or is it merely another way of learning the 'theory' – a better vantage point for students to observe the theory/practice divide from but not a way to cross it?

3 - Design of Simulated Professional Experiences.

3.1 - The Virtual Case Creator

The Virtual Case Creator is a piece of simulation software originally developed by staff from the Faculty of Health, Birmingham City University (Formerly UCE Birmingham). It aims to provide,

> deliberately unstructured, non-linear scenarios that aim to facilitate the safe development of a range of cognitive skills... Scenario cases are described primarily by illustrated representations of aspects of practice. These aim to encourage learners to develop and apply their observational skills and aim to ensure that learners adopt a learning approach that best prepares them for real world practice. (Birmingham City University, 2008)

Although each case is different, the scenarios developed by the team in Health follow a similar pattern. In each scenario there is a decision making exercise that asks them to select fifteen 'correct' items from a potential forty five. These items might be particular procedures that need to be carried out (for example, checking blood pressure or temperature), adaptations that need to be made (for example, raising the height of a bed) or the selection of statements for a report. Many of those decisions can be virtually carried out on the screen. For example, hovering the mouse cursor over the bed rail in fig 3.1 will pop up a message saying, 'Do you want to raise the bed rail?' If the student chooses 'yes', the image changes to one with the rail raised and the choice is registered.

In the spring of 2007 a chance encounter between the author and the principal developer of the VCC led to a conversation concerning the possibility of expanding the use of the VCC in an Initial Teacher Education situation.

3.2 - Adapting the VCC for use with Initial Teacher Education students

Two scenarios were developed for use with an upcoming taught module that had, at its core, an aim to develop students' understanding of multi-agency working in light of the Every Child Matters Agenda (DfES, 2005). To support this aim the two scenarios presented simulated experiences of situations often faced by teachers – interaction with parents and interaction with other professionals. In order to facilitate this, a 'virtual school' was created. A staff list was drawn up, policy documents written and graphics of the school exterior and interior were created. An Ofsted report was also created to lend an air of authenticity and support the students in relation to suspension of disbelief. It was felt that the more 'real' elements were incidentally included, the more the students would 'buy into it'. The scenarios would be set within a Year 2 class in this school with the student accessing the simulation taking on the role of the class teacher. Amateur actors were employed to take on various other roles and video footage was shot of a variety of situations/discussions. Upon contacting a local amateur dramatic society it was realised that several of them worked within education. It was therefore possible to cast 'real' people in the roles of Special Educational Needs Co-ordinator, School Nurse and Educational Psychologist. Once again, it was felt that this would add to the sense of reality and support suspension of disbelief. Still shots of the actors were then used by the graphic artists to represent the characters in drawn format.

In the first scenario the ITE students were required to examine a range of data including comments from children, school reports, records and written work to form a view about a particular child. In the second scenario, the student takes on the role of a newly qualified teacher attending a multi-disciplinary meeting to discuss the child. The student is able to select questions from a drop down menu and see video recorded responses to those questions. Different questions to different individuals result in responses ranging from valuable information, through a sense of confusion to anger at what is being implied.

4 – The research study

4.1 – Research aims

Much research of the past fifty years has identified a gap between the value students place on time spent in school and the time spent in faculty. The introduction of the VCC to a teacher training programme was seen as a valuable tool in making the time spent in faculty seem more relevant to the students. The key aims are therefore to find out what value these students place on time spent in school and in faculty and what value they consider simulation experiences can and, in this case do, have.

4.2 Methodology & Methods

The research is partly driven by the concept of 'third place' (Bligh & Bleakley, 2006) and an attempt to establish the relevance of this theoretical framework to ITE students. However, it might also be regarded in some sense as 'grounded theory' in that as the research proceeded; themes emerged through coding that were not necessarily considered at the planning stage (Bryman, 2004). As such it

is essentially a mixed methods approach involving quantitative and qualitative elements in three phases.

In Phase One, self-completion questionnaires were used to elicit attitudes towards the relationship between faculty and practicum experiences and attitudes towards the value of simulated professional experiences. Phase Two took place after exposure to the simulation experiences during the taught module and consisted of self-completion questionnaires asking the same questions about the value of simulation. In both cases Likert scales were used to quantify responses to questions concerning attitudes. Students' responses on before and after questionnaires were mapped so that it was possible to see individual changes in response to similar questions. The responses were subjected to simple statistical tests where appropriate.

As a result of the analysis, Phase Three consisted of indicative case studies of students who were selected based on changes in attitude. Four student types were identified as follows:

- N-N   Negative before – remained negative afterwards
- P-P   Positive before – remained positive afterwards
- N-P   Negative before – became more positive afterwards
- P-N   Positive before – became more negative afterwards

Two of each type were asked to take part in semi-structured interviews that attempted to draw out a deeper understanding of their points of view. The interviews were audio-recorded and transcribed. The transcriptions were subjected to a simple content analysis; however, the audio recordings were examined alongside this for signs of particular emphasis, such as when the conversation became more or less animated indicating strength of feeling or apathy. In the results section these students are coded as N-N:1, N-N:2 etc.

4.3 – The Sample

The sample chosen for the study consisted of a group of students in their third and final year of a BA (Hons) programme in Primary Education with Qualified teacher status. The data collection took place following their final teaching practice. The cohort consisted of 135 students. All students present at a year meeting were invited to take part in person following a very brief introduction. Approximately 100 students were in attendance of whom 74 (6 males & 68 females) returned both parts of the questionnaire. Following the second questionnaire 8 students were identified for follow up interviews.

Although there is a wealth of research evidence to suggest that attitudes to ICT based pedagogies may have gender specific elements, the small sample size made it unwise to consider that issue here.

5 – Results

5.1 – Relative value of faculty based and practicum experiences

Students were asked to give a value in percentage terms for each of four statements to total 100% as follows:

- Relative value of faculty time: lectures/ taught sessions
- Relative value of faculty time: talk/discussion with peers
- Relative value of school time: practice in the classroom
- Relative value of school time: talk/discussion with mentors/class teachers

All figures as % to one decimal point	Relative value of faculty time: lectures/ taught sessions	Relative value of faculty time: talk with peers	Relative value of faculty time: **Total**	Relative value of school time: practice	Relative value of school time: talk with mentors	Relative value of school time: **Total**
Mean	**19.4**	**14.7**	**34.1**	**44.9**	**20.9**	**65.8**
Std Dev	6.9	6.1	10.5	13.5	8.1	10.3
MAX	40	25	50	75	50	85
MIN	10	5	15	20	5	50
Range	30	20	35	55	45	35

Fig.1 attitudes to different aspects of training (n=74)

The results (Fig.1) are consistent with other research (Foster, 1999; Brooks, 2006; Jones et al, 1997) in this area in finding that generally these students place a significantly higher value on practicum experiences than on faculty based experiences.

5.2 – Value of simulated professional experiences

Two key statements were proposed for the students to evaluate before exposure to the simulation:

- I think such a simulation can be a close approximation to reality and
- I think such a simulation can adequately prepare me for the reality I will face as a teacher

These were re-phrased into the past tense for the post experience questionnaire.

Students were asked to consider the extent to which they agreed with each statement on a Five point Likert Scale: Strongly Agree (5), Agree (4), Neither Agree nor Disagree (3), Disagree (2), Strongly Disagree (1)

For the purpose of the analysis, these levels were assigned the numerical values in parenthesis.

Agreement with the statement that the simulation could be a close approximation to reality was generally on the positive side of neutral (mean = 3.3, mode = 3, median = 3) before the experience. As can be seen from the graph (Fig.2), although a neutral attitude predominates, there were many more positive responses than negative.

In relation to the students expectation that it could prepare them for reality, the students were generally slightly more ambivalent (mean = 3.1, mode = 3, median = 3) with a more even balance between agree and disagree.

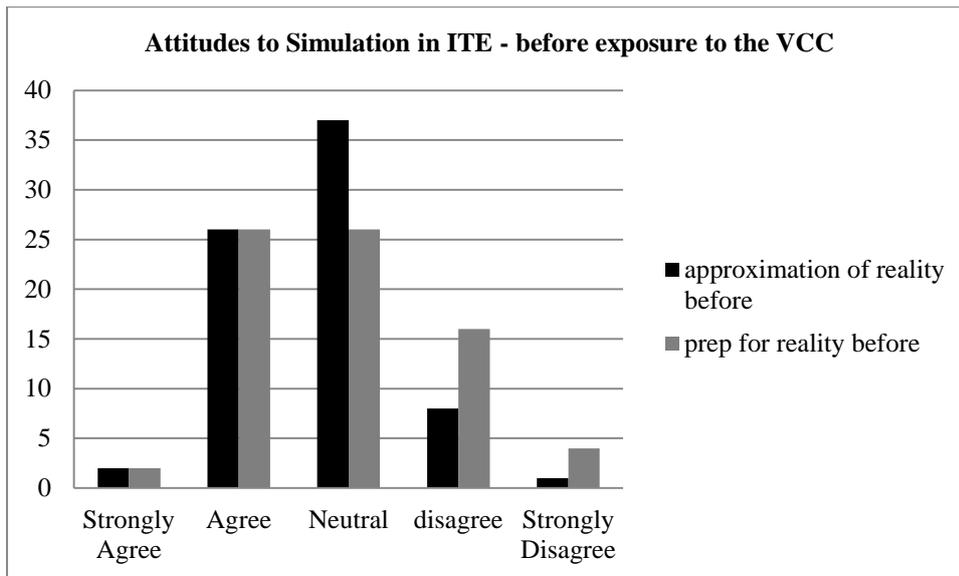**Attitudes to Simulation in ITE - before exposure to the VCC**

Fig.2 – attitudes to simulation usage in ITE – before VCC usage

After exposure to the VCC (Fig.3) attitudes to both approximation and preparation had generally become more positive with the number of neutral responses down and the number of 'agree' responses up.

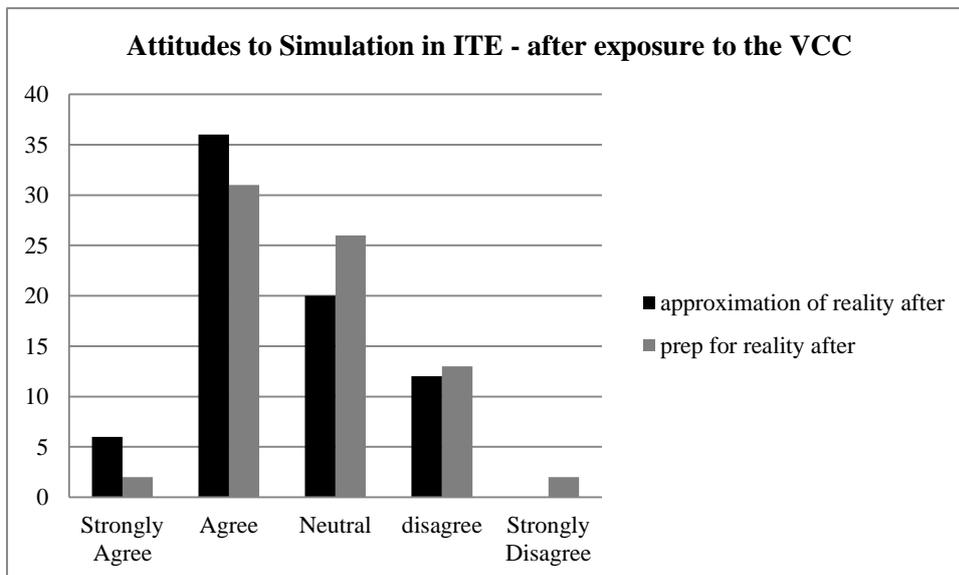**Attitudes to Simulation in ITE - after exposure to the VCC**

Fig.3 – attitudes to simulation usage in ITE – after VCC usage

From this initial look at the data it would appear that exposure to the VCC had had a positive impact on the students' attitudes towards simulation in their own learning. However, by comparing the changes in attitude to approximation and preparation together (Fig.4 and Fig.5) an unexpected difference can be noted.
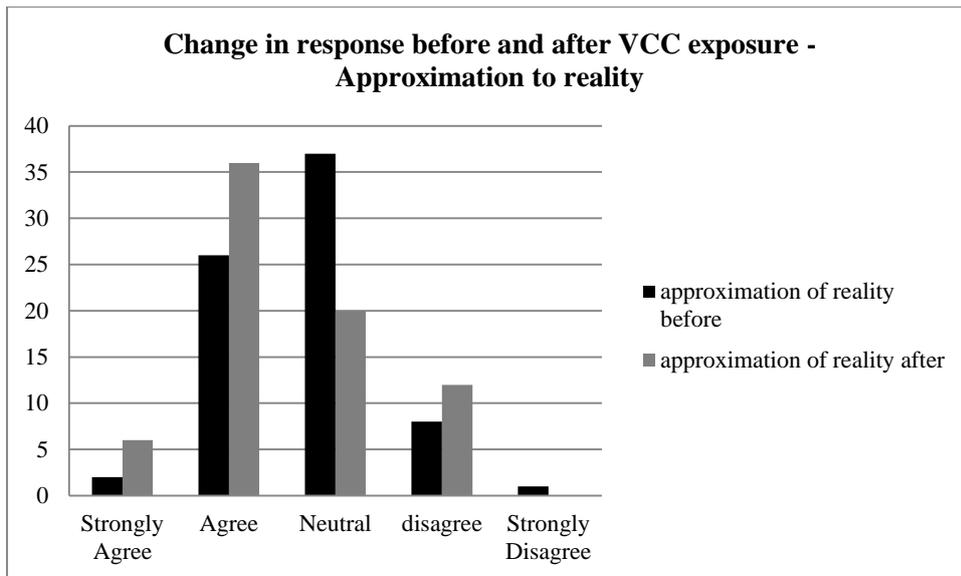
Fig.4 –change in attitudes to approximation to reality after VCC usage

When considering changes in attitude towards the approximation to reality that the VCC gives, there is a noticeable move towards the positive. However, when looking at preparation for reality, very little such movement is noticed:
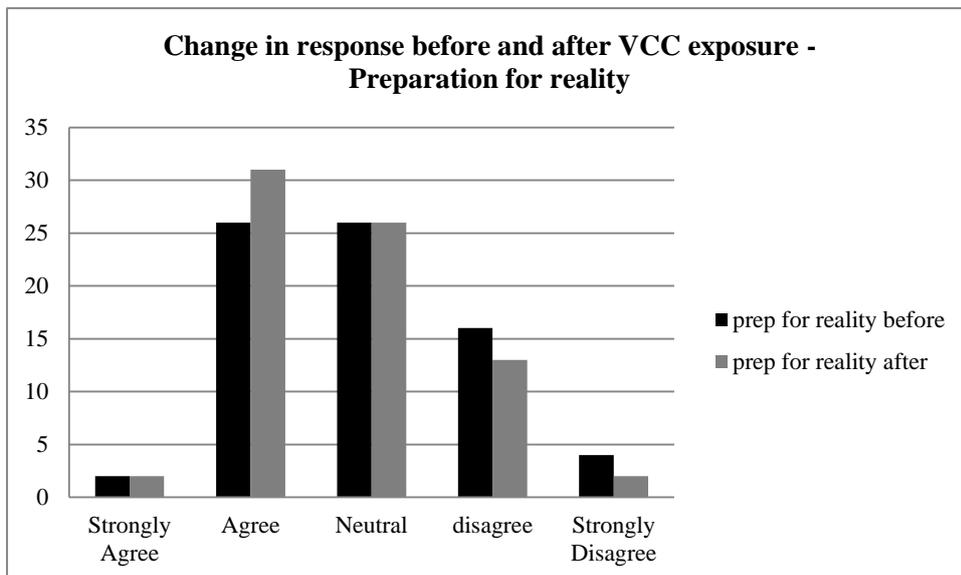

Fig.5 – change in attitudes to preparation for reality after VCC usage

If this was simply because the students felt that the VCC was not a particular good example of simulation in education, then student interest and engagement might have been expected to decline. However (Fig.6), in response to the statements, 'I expect to find/I found this use of a computer simulation interesting and engaging', there was very little change in this respect.

Change in response before and after VCC exposure - Interest & Engagement
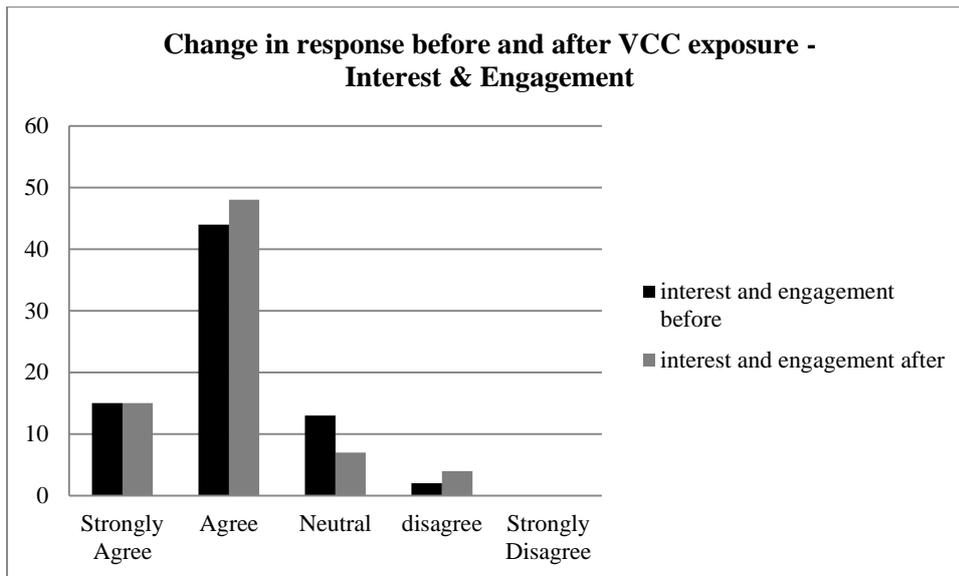

Fig.6 – change in interest and engagement – before/after VCC usage

6 - Discussion of Results

6.1 – The relative value of faculty based and practicum experiences

Before exposure to the simulated experiences students generally considered time in school as being nearly twice as important as time spent in faculty. Interestingly, the values placed on discussions with existing teachers in school and learning from lectures was quite similar (21% and 19% respectively) perhaps indicating that the students do not necessarily perceive lecturers to be 'out of touch' as is sometimes reported in studies. Another striking feature of the results of this question is the relatively low value placed on peer discussions. These students attend a faculty where great value and emphasis is placed on a co-operative learning, social constructivist approach to learning. Most lectures are in fact taught in groups of around thirty where students sit at tables of six (similar to common UK primary education practice) and discussion is a key feature of the sessions. The fact that they do not generally regard this as a major part of their learning process might be indicative of a 'teaching is telling' or transmission view of education. This was further indicated during one of the interviews when one student made the following statement about the value of the work done in sessions:

> *"I think you learn a lot more when you're in school than when you do here [sic] 'cause lot of it is paper based – a lot of it is to do research – like constructivism: when am I going to use that to teach year one in the schools?"* (P-P:2)

Although not always stated in such extreme terms, *all* interview respondents clearly expressed an attitude of giving high value to time spent in school and in doing so, perhaps surprisingly, most indicated a similar transmission view of education at odds with a constructivist pedagogy that is seen as permeating the course. For example, (note the bold type – my emphasis, not the students')

> *"you learn much from school experience, obviously you can **get told** a lot through classes and assignments but I think when you're actually there you are experiencing everything that goes on."* (P-P:1)

and

"I think when you are in a school context you learn more... and in faculty you just get the information delivered." (P-N:1)

Even in cases where students took a balanced view, there was a tendency to perceive the balance in terms of 'school is doing, university is being told' – for example:

*"Obviously **we are told** how to do things... putting that into practice you still need to relate back to what you're taught in faculty. I don't think you should do the practice if you haven't put some theory into it."*(N-P:1)

The attitude displayed by these students towards what has been called the 'faculty/practice' divide is not apparently complex. In general terms they take the view that one can only really develop as a teacher by teaching. This seems to indicate that the students have narrow views of what it is to learn to be a teacher similar to those discussed in the review of the literature.

6.2 - Value of simulated experiences

The findings from Phase One and Phase Two suggest a problem may exist when designing virtual scenarios for ITE. In this instance many students generally enjoyed the scenario and considered it to be close approximation to reality and yet still did not really consider it a preparation for reality. It seems that for many students the embedded view that only in the real workplace can they find value in training was not significantly altered by a positive experience of computer simulation learning.

In order to try to understand in more detail the attitudes towards the VCC in relation to approximation to reality and preparation for the real world, these topics featured significantly in the Phase Three semi-structured interviews.

Those students who were initially positive about the VCC were so for a variety of reasons. A theme that was touched upon by two of them was the idea that this was something new and different. *'Initially I thought it was really, really a good idea. I was quite excited to do something different'* (P-P:1) *'You straight away thought, "oo, this is exciting, there is a lot here that you can learn".'* (P-N:2). One student may have had high (perhaps unrealistic) expectations due to the use of the word 'virtual' which may have set him in mind of virtual reality machines. *'When you're on a fairground, you sit in a simulator, how real it all is.'* (P-P:2). An insightful comment from one student identified part of the rationale behind the use of the VCC.

> *'I was thinking from previous experiences when you're into school you come across things, for instance, child protection or healthy eating, but you're not really told how to go about it or dealing with parents and when you're in school as well, even though you're acting as a teacher, the actual teacher are still in close contact with parents and things so you sort of push back so you don't get the chance to actually try and see how it would work with the parents or with different people coming in like psychologists, so with having that I was thinking well, I'd be able to find out how I go about that cause that's what I felt, from experience, I hadn't got enough on that.'* (P-N:1).

It is interesting to note that the two students chosen to represent those who became more negative in their attitudes after using the VCC both focussed on the content of the learning in their initial judgements. The previous comment also highlights the 'teaching is telling' view held by this student: *'you're not really told how to go about it'* and *'I'd be able to find out how I go about that'* seem to imply the expectation that the VCC provides tutors with a better way of telling the students what to do, rather than giving the opportunity to actually do it. The whole point of a simulation is that the users' responses should be 'real' even though the outcome is 'pretend'.

Similarly, the reasons given for becoming more negative reflected a feeling of constraint or limitation in what was possible.

> *'there were certain things that I would liked to have asked and obviously I couldn't ask. They weren't there, they were just – It was limited in the fact that the responses - to certain things I would have liked to have been able to ask....'*(P-N:2) ,

> *'I was expecting to have a bit more information and because we'd got the head teacher's report and then the [short pause] the meeting, I was thinking that we'll, it was going to inform me of well, what came up, how I would go, who I would go to, where was these people already sitting on the table who I already knew who I should have contacted where as I'd have liked to say, well who would I get involved.'* (P-N:1).

It was put to the student that in the 'real world' one does not always have all the information to hand, or know why decisions are taken and that this was an attempt to create a scenario that felt real. The response is quite illuminating:

> *'Um, yeah but I think with- If I knew more about each role and all the different people who could help then I think I would have been able to say, well I think this person needs to get involved because of... whereas I didn't have that opportunity to say it because they were already at the meeting.'* (P-N:1).

This seems to imply that the student feels that having all the information in advance is necessary in order to make decisions. Such an approach would seem to be consistent with her previous statement that, *'By going into school you can put everything you have learnt into practice and you learn different things as well from that'.* (P-N:1). Although this student places more value on faculty based learning than some students do, she clearly perceives the 'Faculty/School' divide as equivalent to a 'Theory/Practice' divide. In other words, she does not expect to learn anything practical in faculty – she expects to learn the theory that she can later apply in the real world. She does imagine that she could learn practical skills outside of actual practice.

In both cases where the students remained positive, the perceived reality, particularly in relation to the emotional response generated, of the situation was cited as a contributory factor.

> *'I really got into it, I don't know if I passed it or not [laughs] but I got me head round it. It had some good things into it. But mostly I thought it was positive 'cause you could see Ashley, you could see his mom, you got all them people including the psychologist, you got all them in the room, they were all real people, they're giving interviews and that's the kind of words they'd come out with, the kind of language, the emotions as well cause Ashley's mom, if you asked them the wrong question, she got "I'm not answering that", so it was real.* (P-P:2)

Equally, for those students who were negative after the experience, the lack of authenticity was cited as an issue. For example.

Interviewer	*Did he feel like a real child to you?*
Student	*No*
Interviewer	*Can you explain why that is?*
Student	*Because they keep replaying him, I don't know, I know it's obviously very hard to get a real child to say all the things you want them to say in the video clip but it was so disjointed it didn't feel real because it felt like a ten year old trying to remember fifty things and what to say rather than an actual child. (N-N:2)*

One of the recurring themes of the interviews with the students with more negative views after using the VCC was the inability of the software to simulate the reality of the complex social interactions inherent in the school situation.

> *'It's not just to do with them, it's to do with everyone and there's lots of other factors that impact on it'* (N-N:2) ,

> *'the home life, I wasn't too sure on that 'cause some of the information that was given to me couldn't really use them, I wasn't really convinced of the school, the home life of it.'*(P-N:1)

and

> *'it wouldn't be real but I just think that the situations that could come up online are very formulaic and yes it's going to be like this, it's going to be like this but I think that real life situations are going to be far richer experiences to get feedback from.'* (N-N:1)

When probed about the preparation for reality that the simulation provided, opinions were generally similar. Irrespective of positive or negative views generally, the students all expressed a belief that simulation could not replace actual experience in school as the place for learning professional skills.

This seemed to be held to be true even by those students who appreciated that it is not possible for students to have experience of all possible eventualities during the necessarily limited time spent in school. The following longer extract from the interview with N-P:2 exemplifies this issue.

Interviewer	*Did you have a sense of him as a real person?*
Student	*No.*
I	*Why was that?*
N	*'Cause we weren't told enough. We were told other people's opinion of him, we got a short video looking at what he was saying but you don't know him. I don't think you know someone until you talk to them.*
I	*Ok. Is that, is that a limitation of that piece of software or a limitation of the principle, do you think, of virtual reality or virtual scenarios?*
S	*I don't know if it makes a difference still, but then again if you are told more information that's a bigger picture.*
I	*I mean, could you imagine a piece of software that was much more powerful that might be able to do that or do you think you'd never get to that point, you think it'd never be the same as a real child?*
S	*No, It'd never be the same. I don't think it'd ever be the same.*

Similar views were expressed by all students – other examples include:

N-N:1

Interviewer	*Do you think if universities and places that did teacher training developed more of these sorts of things that would shift somebody like*

	your perception, this, you know, eighty: twenty school to faculty, do you think that would be shifted by this kind of, this kind of technology?
Student	*Yes but not a great deal, I don't think just to, like, introducing us to lots of things, as a lot of things in the faculty are such as introduction to history, introduction to science teaching and things like that, yeah, it would act as a good introduction but again I don't feel there is any substitute or adequate substitute for the real thing.*

The idea of 'shifting the balance' towards a more even appreciation of the value of both faculty and school based experiences was put to all of the students. Similar responses were noted as to N-N:1 above. That is, there was a general feeling that simulations would increase the value of faculty based work but never could replace it. Whilst some students saw more value than others in the use of the simulation, none of the students saw the simulation as a bridging activity between faculty and school.

7 – Conclusions

The use of computer simulation in Initial Teacher Education is a relatively new and unexplored area. This study has looked at one attempt to introduce computer based simulation into an ITE undergraduate course with the specific intention of eliciting and describing students' attitudes towards it. This is a small scale research project that hopefully has a high level of relate-ability to professionals in similar situations. A range of methods, both quantitative and qualitative, were used and there is no attempt to generalize from the data produced. However the unexceptional nature of the cohort of students implies that the issues raised here will be similar in other institutions.

As might be expected, the students in this group displayed a range of attitudes towards the use of computer simulation. What became clear is that any two students might have completely different reasons for answering any particular question in the same way. In this sense the mixed methods approach was successful in uncovering some of the underlying issues that a purely quantitative approach would have missed.

In relation to the question of how much value students place on different aspects of the course, almost without exception, the students placed a higher value on time spent in school than on time spent in faculty. The results of the study in relation to faculty/school divide indicate clearly that such a divide does exist in the minds of these students as was predicted from reading the literature. An inability of some students to recognise value in faculty work seems not to have impacted on their initial perceptions of the use of the simulation as much as might be expected. Students with a low opinion of the value of faculty based work appeared to have similar expectations as those with a more balanced view. The reasons for these views could be quite different. Those who had a very technicist view of education (and value practising in the classroom most highly) also tended to adopt a behaviourist pedagogy. For these students, initial reactions to the VCC seem to have focussed on the novelty value and motivational aspects of a module being taught in a different, unusual or 'fun' way. Students who do not 'buy into' a social constructivist view of their own learning appear to be less likely to evaluate the use of computer simulation in those terms. The result of this is that students who are less reflective and constructivist in their views tended to express similarly (on the surface) positive views to those who are more reflective and constructivist. For these reasons, students were equally likely to value the computer simulation. If tutors are not concerned with why the students value a computer simulation approach then this would appear to be a win-win scenario. However, this study indicates that beneath the surface of any statistical evidence that such an approach is valuable, there may be issues of a more profound nature relating to a fundamental view of the value of any experience other than those gained in a real school situation.

With regard to the issue of fidelity in simulations, for most students the 'degree of reality' was important in informing their view of its value. However, the way in which they decided on how 'real' it

was differed. For some it was about the look of the interface. The images of the classroom, the meeting room and the home were designed to have a genuine look to them. The fact that much of the presentation, particularly in scenario two was through talking heads video also supported this sense of it 'looking real'. For others reality was more about the language used by the people and the emotions shown in the videos. Again, all of this was designed in to support the sense of reality. In some cases an aspect of reality that seemed to have a negative impact on student attitudes was the 'messy' nature of the scenarios. The fact that some information was repeated, some was missing and some of the practice implicit in the simulation was not 'best practice' was sometimes misunderstood (or not understood). There is an issue here in relation to managing student expectations. In one sense, the approach taken by the tutors is a 'throw them in and hope they swim' approach. This is meant to simulate the reality of a new teacher in a situation that they are not prepared for. However, if student attitudes can be affected by not understanding that this has been done, tutors need to consider how the simulation is introduced to the students. If students do not understand the principles behind our pedagogy for the use of simulation, it seems likely that some will misinterpret and have a poorer attitude towards it that they might otherwise have.

Whilst the students involved in this study had a range of attitudes towards the usefulness of the simulation, the main conclusion to be drawn is that they did not generally see the simulation as a bridge between faculty and reality. There was not a sense that they could see the simulation as a way to develop 'real' skills because the simulation itself was not real. Some seemed able to suspend disbelief sufficiently to engage in the simulation as a useful learning tool, but even these did not appear to view it as kind of practice. In as much as they thought about the philosophy of the approach at all, there was very much a sense, even amongst the most positive, that the only way to really learn how to teach is a 'trial and error' or 'do it for real' approach.

8 – The Future of Computer Simulation in ITE?

One of the unexpected outcomes of this study was a developing awareness on the part of the researcher that the ethical dimension of a practicum based Initial Teacher Education system is rarely discussed. At first this was not considered as one of the questions and hence no items on the pre or post experience questionnaires were directed towards it. Analysis of the interviews led to reflection on this issue and a wider reading of related literature. This led to a reflection on the difference between the views of educators in medical and military fields. A re-evaluation of the original process of setting up the VCC project indicates that the issue of whether a 'trial and error' approach to teaching children is acceptable was briefly discussed by the development team but was not followed through. It is simply 'accepted' that a trainee medical practitioner should not practise on real cases until they have demonstrated some competence in a simulated environment. It is also 'accepted' that trainee teachers should go and practise on real children at the earliest possible opportunity. This view, and the ethical implications of it, seems to be rarely if ever questioned by either students or providers.

The use of the computer simulation, then, raises philosophical questions that in the future may need to be addressed by ITE providers. If we are now beginning to develop a technology that allows for the simulation of teaching experiences, should we not use this to ensure that trainees demonstrate some competence 'virtually' before they do it for real? The faculty where this study was carried out now has a piece of software that effectively simulates one particular case conference. Should all our trainees be made to show a level of competence in its use before they are allowed to attend a real case conference? Certainly it would be all but impossible to arrange for them to attend a real one. Use of the VCC and similar simulations may only be the beginning in Simulated Initial Teacher Education. The key driver in other areas of initial training, such as the medical professions, civil aviation and military command is the ethical consideration of what happens when things go wrong. ITE providers need to find a way to measure the impact of student teachers on the children they teach. There is plenty of anecdotal evidence that exists from teachers who have reported both positive and negative impact on the children, but there is almost no research base in the field and what there is, is almost exclusively secondary school related (Price & Willet, 2006). A few studies have looked at potential benefits (Cunnah, et al, 1997, Boyd, 2002) but these seem aimed at downplaying any potential drawbacks, and those that are discussed relate to 'the school' generally (taking up mentors time etc.) If it turns out that some students have a detrimental effect on children then the application of virtual simulations may be a positive step forward.

The technology to create immersive, high fidelity simulations of teaching scenarios may be some way off in the future, but in ten or twenty years' time ITE may reach the point where other professional training systems are now. To return to the military applications of simulation mentioned previously, if a pilot, as part of the training, lands an aircraft in a computer simulator, can one say that he has 'really' landed an aircraft. The obvious answer is 'No' – because he has yet to land a real aircraft on a real runway. However, the cognitive and physical responses are the same in both cases. The same decisions must be made. The same buttons must be pressed and levers pulled. Because of the *relatively* simple problem of modelling the physical world (relative to the problems of simulating human behaviour), the quality of aircraft simulations now available means that the only effective difference between simulation and reality is the consequence of failure. In the virtual environment one can merely try again, whereas in the real world one is dead. As the cognitive and physically challenges are the same, the essential difference is that of emotion. The pressure of doing it for real may affect the ability to be successful. If we thought that emotion played no part in such a difficult and dangerous activity, we would not care if our own pilot had never 'really' landed an aircraft before. However, we know that emotion can impact on cognitive and physical ability, and so we would be uneasy to think that our pilot had never done it 'for real'. For this reason, it seems unlikely that Virtual Teacher Training could ever fully replace 'teaching practice' even if the problems inherent in modelling human interactions could be solved. It might, however, fundamentally change the way we see ITE and the processes we make students go through before we allow them to practise on children.

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