Developing pre-service teacher knowledge using online forums: supporting confident and competent teaching practices.

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Abstract

This small study examines how one group (n = 59) of first year undergraduate students developed their knowledge through co-construction using an online forum as a platform as part of a three-year Initial Teacher Training (ITT) programme. Professional dialogue at the online interface supported them to cope with the challenges they faced during teaching practice. The data showed that there were gains in student subject and pedagogical knowledge, observed to a greater extent among the peripheral learners. The data presented provides an alternative view from that published in existing literature about the size and type of both peripheral and core online interactions that were useful in building the confidence and competence of students in the role of teachers in a primary classroom. Ultimately the online knowledge exchange among peripheral participants provided agency in learning, over actions and the ability to cope during teaching practice. This was corroborated by student self-assessment using post-online reflective brainstorms. Sixty-four percent of the students concluded that they would use this new subject and pedagogical knowledge when in school as part of their teaching practice.

Keywords: Initial Teacher Training; Pedagogy; Online; Co-construction of Knowledge; Agency; Competence; Teaching Practice.

Introduction

The context for the research was focused within a UK University of Higher Education (HE) specifically the training of a year one group of fifty-nine ITT students studying a professional studies module as part of a three-year BA Primary Teaching Programme. The taught course encompassed a blended approach to learning and teaching. For the purposes of this paper 'blended' refers broadly to the use of technology outside of lectures to complement face-to-face teaching. The taught programme comprised of a weekly two-hour, face-to-face lecture, supported by online professional dialogue around problematised teaching practice scenarios. Students engaged with three scenarios: the first described a child exhibiting challenging behaviour and asked the students to discuss how they would manage that behaviour. The second scenario identified with a child with Special Educational Needs (SEN) and the students had to suggest reasonable adjustments that defined the support they felt was required to ensure that the child made expected progress in learning. The last scenario was a planning activity that stimulated enthusiasm to engage in scholarly activity, planning was peer-reviewed online by the students. Although blended learning is not a new methodology, in this small study the lecturer facilitated the 'getting started' in the conversations online by posing a question based on the problematised scenarios but then quickly became an on-looker. The online space re-defined the teacher-student roles and empowered the students to take control of their own learning, at their own pace, in a way that was not observed during face-to-face lectures, where the lecturer was seen as the teacher. With each scenario students relied less and less on the lecturer and used each other as a source of knowledge and support.

Research Questions

The researcher proposed to examine in more detail the following research questions:

1. How do ITT student perceptions of a personal level of subject and pedagogical

knowledge affect their participation in online professional dialogue?

2. How is the information gained online [the learning], assimilated by the students and put into practice during teaching?

Ethical approval from the School of Education was sought to conduct the research and was granted in February 2015. Individual consent from each of the students was also sought. Those who withheld their consent could still engage with the online dialogue but the data was discarded prior to analysis.

Theoretical framework

Theories of learning: knowledge development using online tools.

The use of forums to engage in asynchronous online discussion is prolifically documented in the literature with regards to student engagement and the development of critical thinking skills (for example Kong, 2014 and Loncar, Barrett and Liu, 2014), but is a growing area of research in ITT. Online discussion spaces provide a sense of community enabling the sharing of ideas and knowledge. As all students may not participate in the discussion and with possible time lags between threaded responses, discussions can become fragmented and lacking in depth. Using blended frameworks, as this research did, can mitigate the limiting parameters and enable active central and peripheral participation to occur where the technology can facilitate the process (Halverston et al., 2014). Lave and Wenger (1991) when researching the concepts of participation online discussed the transparency and function of the technology (1991:102) and concluded that success was linked to the social organisation and cultural practices of the people and that when using the technology for communication, the technology actually mediates the conversation process. Lave and Wenger (1991) also

postulated about the transformative effects of technology, having a pattern of communication even, bringing some automation to the thinking process and ability to problem solve. They inferred in what ways technology is redefining 'what it means to know and understand, and what it means to become literate or an educated citizen' (1991:12). Lave and Wenger (1991:43) asked what kinds of engagements in the social context provide a successful context for online learning? In response to this they answered that the learning is distributed between the participants within the learning context, moving away from the focus of cognitive processes and more to view the impact of social practice.

Easdown's (1997) survey of feelings and preconceptions about Information Technology (IT) in ITT, discovered strong support for online group work as students of the survey described a preference for a learning environment of high challenge but low threat that reduced anxiety and fear of failure and appeared to be time-effective. The technology and the way it was used also helped to define the way the knowledge sharing and co-construction took place and whether students were successful or not.

Earlier studies (Trowler et al., 2005; Hrastinski, 2008 and Rushby, 2010) have focused on the enhancement of teaching and learning in HE using learning technologies: including the study of asynchronous and synchronous e-learning methods and how that supported a variety of learning activities. The main advantages drawn from these studies included the kinds of individual contributions or collective threaded responses that promoted and sustained the online conversation. Early stages of online learning was considered particularly important in building confidence; once student confidence was established then it was considered that a higher level of learning could take place.

Communities, Collaboration and Professional Practice

The notion of establishing communities for the purpose of learning has been researched for many years and there are various models that try to represent what these learning communities look like and how they evolve. Wenger, McDermott and Snyder (2002) agreed that these so called 'communities of practice' (2002: 24, 25) take many forms. They referred in the literature to a structural model (2002:27) comprising of three main elements - the domain, community and practice. The domain included the problems members commonly experienced; through the community they utilised shared expertise to find solutions to the problems that evolved both in the dynamic world and from within the community itself. The community allowed participants to belong, whilst engaging through intellectual processes and practice that followed a set of formally or informally agreed frameworks, documents or ideas that the community shared.

Wenger et al. (2002) described the 'degrees of participation' within these communities (2002:56, 57). Central to the community was a small core group that actively participated and represented approximately ten to fifteen percent of the whole community. The next degree of participation was described as the active group whose participation most often was irregular and usually less intense than the core group. Wenger et al. (2002) suggested that the largest proportion of the community were the peripheral members who rarely participated and predominantly watched the activity of the active and core group. However the peripheral group were good listeners and gained insights from the discussions. Success of the community was about members being able to bridge access to each degree of participation. Wenger et al. (2002) postulated that, to be able to master knowledge and skills newcomers to an online dialogue have to move from the periphery to full participation.

Methodology

To remain transparent to the reader the researcher intended to interpret the quantitative data in a qualitative way, maintaining an interpretive paradigm, interested in the qualitative aspects of student perceptions. Student perceptions were treated as valid data from a 'humanistic perspective' (Newby, 2014:39).

Table 1: Instruments, data type and analytical methods.

Research Instrument	Type of Data	Analytical Methods
1. Perception Questionnaires (PQs) a. Baseline; b. Behaviour Management; c. SEN and d. Planning	Qualitative and Quantitative	Interpretive paradigm, Narrative analysis of phrases producing thematic codes
2. Online Scenarios a. Behaviour Management; b. SEN and c. Planning	Quantitative Qualitative	Content analysis of words/phrases used. Thematic coding of type of conversational exchange.
3. Brainstorming – post forum student self-assessment task.	Quantitative	Calculating the percentage of ideas gained online using the equation $\frac{\underline{IaEO}}{II} \times 100 =$ Where IaEO are the Ideas after Engaging Online (underlined on diagram in report) and II are the Initial Ideas (Bold Typeface on diagram in report).
4. Bivariate Kernel Density Plot	Quantitative	Identifying the working clusters of students online labelled as 'core' or 'peripheral'.

Research Design

The PQs contained a maximum of twelve open questions where participants could respond by using typed/hand-written prose to describe a feeling or experience. Alternatively some questions required the selection of a number 1-5 on a Likert Scale

(Likert, 1932), which allowed degrees of response to be differentiated on a numerical scale. Other response options included selecting a yes or no response (closed question), or finally to respond by making a choice of answer from a drop down menu (if electronic) or by ticking the appropriate box (if hand-written). Content analysis was used to gather and analyse the data thematically from conversational exchange during asynchronous threaded dialogue, as part of an online forum embedded in an online virtual learning environment. The researcher adapted a coding scheme by Van Der Meijen (2005) using some of the original meanings but changing the codes to fit the researcher's understanding and interpretation of the terms. The coding scheme was originally devised to evaluate students' knowledge construction in asynchronous and synchronous online discussions. To make the coding more visible at a glance, numbers were used to signify the attachment of a particular code. The coding and numerical key is tabulated below in Table 2.

Table 2: The coding scheme for analysing the sharing and co-construction of knowledge, during asynchronous professional online conversation.

Alpha/Numerical Code		Meaning	Example
DI	1	Developing an Idea	It does sound like x is possibly finding work too hard.
AQ	2	Asking Questions	Is she achieving her target? Is she on track?
V/AA	3	Verifying or asking for Agreement	If this is the case how can teachers find a way to help? Any ideas?
AXE	4	Answering without Explanation	The child was able to identify those in the group he would clash with.
AE+	5	Answering with an Explanation	The child was not able to distract others because he was too busy gathering information.

A/CQ	6	Argument/Counter Questioning	Further to this idea of responsibility, how did the child do this?
GXI	7	Giving Information without elaboration	Using rewards is a positive behaviour management strategy
GI+	8	Giving Information with elaboration	I have seen this approach ....used before.....
REI	9	Referring to Earlier Information	I agree with x ideas about promoting responsibility.
E	10	Evaluating the content	Even though in this instance x is the only one mentioning the work is too easy and boring other children may be finding this also so it is important to ensure all children are being considered.
ACXE	11	Accepting the Contribution of another participant without Elaboration	I agree with all the previous posts
AC+E	12	Accepting the Contribution of another participant with Elaboration	I agree with x, X may be bored with her work perhaps the work being given is too easy.
NACXE	13	Not Accepting the Contribution of another participant without Elaboration	I don't think that is the cause of x's behaviour.
NAC+E	14	Not Accepting the Contribution of another participant with Elaboration	I disagree with this point because the case study refers to..... and this means.....

Results

The whole student group comprised of forty-nine females and ten males. To maintain their anonymity participants were given a number T1 to T59. The average response rate of the four PQs completed was 44% as twenty-six out of the fifty-nine students responded. The twenty-six respondents to the PQs comprised of sixteen females and ten males with five mature students representing each gender (five mature females which

equals thirty-one percent of the total female respondents and five mature males equalling fifty percent of the total male respondents respectively). It is important to note here that twenty-seven percent of the whole student group (sixteen out of fifty-nine students) were mature, which is defined by the University and Colleges Admissions Service (UCAS, 2016) as 'anyone over the age of twenty-one who did not go to university after school or college'.

The researcher was aware that when interpreting the data one could not assume that these perceptions alone, were the main influencing factors on the performance of this particular group of students, both in their assessed work and in preparation for teaching practice. The causation might be dependent on other contributions such as, support from a school mentor, personal academic reading, or a combination of such factors.

Baseline Data

The qualitative data on the students' background revealed that this cohort of students had, had a very varied experience and amount of time in schools post their own education. This ranged from some having had a limited number of weeks in a school setting during their late teens to others having a number of years experience.
Twenty of the twenty-six respondents reported that they had experience of managing children's behaviour and could describe some of the strategies they had observed and/or used personally.

Behaviour Management

Quantitative data revealed there was a sixty:forty percent division in the responses. Sixteen of the twenty-six students who responded were positive about learning and used

words and phrases as part of their responses like for example; 'It was interesting to see what others thoughts were' (mature female, T52). Other responses on the topic of behaviour management included 'since my personal experience [in teaching] is limited other people's experiences and guidance is always welcome and not always common in lectures' (mature male, T21). And 'my understanding of behaviour management strategies has changed, when on placement this knowledge will be useful' (Female, T35). Ten students were less positive or felt negative about working in this way and used words and phrases in their responses such as; 'At first I was unsure as to whether to type and enter my initial thoughts' (mature female, T31). And 'I don't feel as confident online, I would rather talk socially' (female, T42). 'I saw the online communication as another form of assessment' (mature male, T21). Even though some students felt less positive about communicating online all twenty-six of the responding students answered 'yes' in question 2, that sharing knowledge about behaviour management in this way was useful.

Supporting Children with Special Educational Needs

All twenty-six of respondents were positive about using online communication tools to discuss strategies for supporting children with Special Educational Needs (SEN). They reflected that it was useful because they had limited knowledge and experience of supporting children with a specific need in the classroom.

Students' planning for children's learning

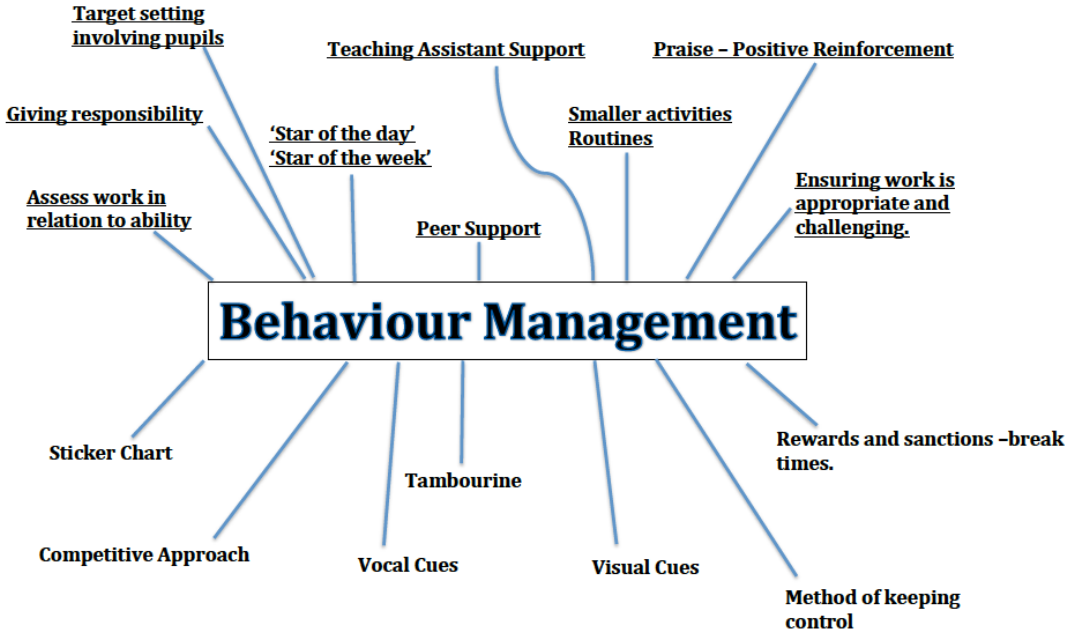
Students spoke about the value of the peer reviewing of planning online during subsequent face-to-face lectures and talked of the support to them in improving their plans in preparation to teach. There was a fifty:fifty percent positive to negative split in

how students felt about peers reviewing planning using online communication tools. Students who had positive perceptions said, 'They could have time to process the information and formulate a response to improve or edit plans' (mature male, T5). They 'could confirm we had used the correct terminology' (mature male, T21), and the conversation 'aided my understanding of learning objectives and success criteria, and to become familiar with the lesson planning format' (female, T32). Negative perceptions about working in this way included 'trepidation about responses to my comments' (mature male, T30) and 'I don't like to feel like I am being judged by others' (female, T32).

Brainstorming – post forum self-assessment task

After engaging online, students were asked to reflect and represent in a brainstorm their ideas about behaviour management (see Figure 1). Their initial ideas before engaging online (II- Initial Ideas) are in bold typeface and the ideas they felt they had gained and supported their knowledge development after engaging in online discussion (Ideas after Engaging Online – IaEO) which represents the co-constructed knowledge in underlined text. Forty-two out of the consenting fifty-nine participants completed the self-assessment task using a brainstorm; this represented seventy-one percent of the total consenting participants.

Figure 1: Example of a student's brainstorm showing knowledge before engaging online (bold typeface) and after engaging online (underlined).



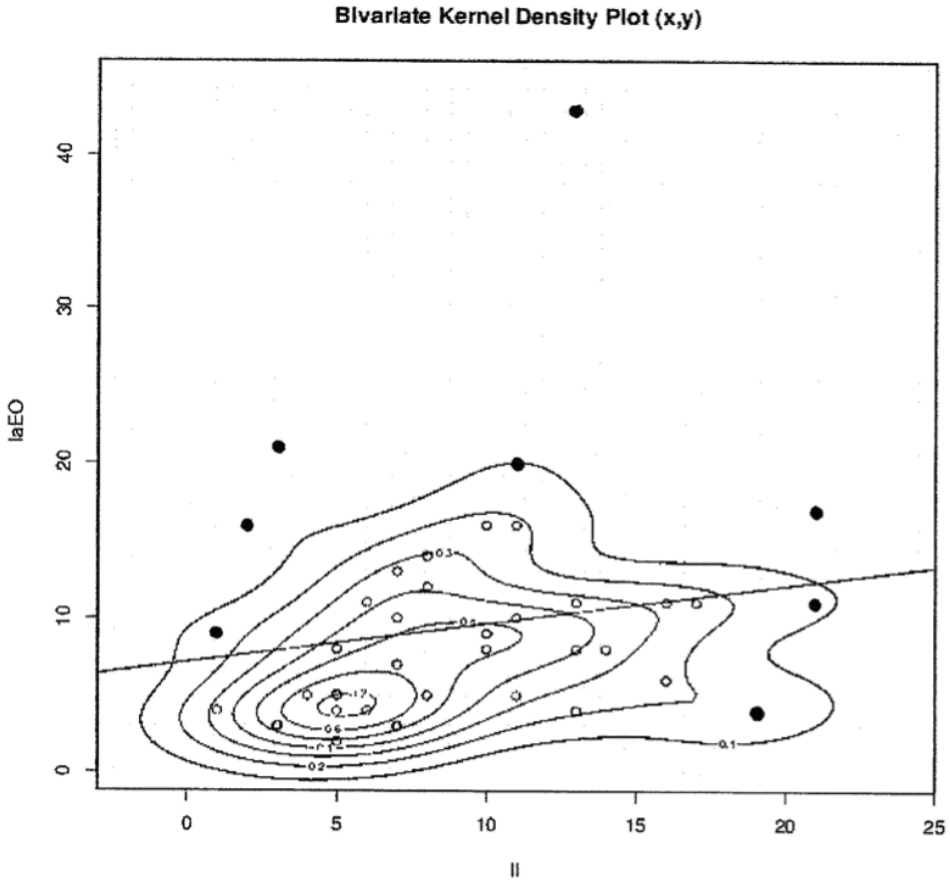
When analysing the brainstorms it was easy to see the number of initial ideas (II - bold typeface) and those added after the students had engaged online (IaEO - underlined text). This could be converted to a percentage (%) to represent what the students had interpreted as ideas 'gained' or co-constructed online (calculated by dividing the number of ideas represented after engaging online (IaEO - underlined text) by the total ideas (TI) on the brainstorm, then multiplying by one hundred. The total ideas were calculated by adding the initial ideas (bold typeface) to the ideas added after engaging online (IaEO) in underlined text. For example the % gain as represented by brainstorming was:

IaEO/TI) x 100 = representative % of ideas gained.

Bivariate Kernel Density Plot – identifying working cluster 'core' or 'peripheral'.

Seventeen of the forty-two particpants were identified as core participants who posted threads and read the online conversation. Nine of the forty-two were participants at the periphery of the conversation (reading threads only). When a bivariate kernel density plot (Figure 2 below) of the initial ideas (x =II) against the ideas added after engaging online (y = IaEO) the plot clearly showed that the core activity was dense and fairly similar in terms of numbers of ideas shared online. Peripheral learners were much more diverse in their contributions; seven of those were closer to the core activity (slightly outside of it) where two of the nine peripheral participants (overlapping at the top of the 2D plot) had represented over forty ideas after engaging online, they clearly felt they had gained a lot from working on the periphery of the online discussion.

Figure 2: Bivariate Kernel Density Plot of II (x) and IaEO (y)



Key	Symbol	Participant Type
	●	Peripheral
	○	Core

Discussion of the Research Findings

Baseline Data: the use or prior knowledge

The techniques described by students online, were all positive behaviour management strategies implemented in accordance with schools behaviour management policies. The contract between ITT students and their practice schools stated that they must adhere to the establishments' policies. Fewer of the respondents were clear about planning for children's learning with only seventeen out of twenty-six feeling they had gained experience and could name what they felt were features of a good lesson plan. The

lower response rate was justified within the data as student experience involved scaffolding learning using the planning provided by experienced teachers (rather than planning themselves), to support the activities of small groups and individuals including those children with specific needs. The numerical data (representing quantitatively a small sample size) from section two of the baseline questionnaire demonstrated that all of the respondents were familiar with using online communication tools. The data showed that seventeen out of fifty-nine students admitted that they had not used online communication tools as part of previous study, leading the researcher to conclude that for some online engagement, as part of the study would be a new experience. Therefore, how they might personally engage online may be impacted upon due to this lack of experience within the context of this research.

Behaviour Management: learning to cope, gathering strategies

Seventeen students through the conversation had identified new strategies to support dealing with specific behaviours exhibited by children in the classroom and appreciated the different thought processes and viewpoints shared online. They verbalised that they would use this new knowledge when in school as part of their teaching practice, to deal with a range of behaviours. One respondent (mature female, T31) specifically felt that they had a greater appreciation of the various opinions and the variety of behaviours people had dealt with. Whilst another said they would use the knowledge to reconstruct their own ideas and adapt their theories when dealing with behaviour in the classroom (mature male, T30). One student felt that this would support their knowledge when writing academic essays for assessment (mature male, T21). Eleven students felt that their opinions about behaviour management had been changed and that this in turn would affect their practice. They felt they had been exposed to more options in terms of the behaviour strategies that might be employed when faced with a similar situation.

They actively discussed strategies they had used or observed more experienced colleagues using, during online discussions and, below is an example of the content analysis of the threads of conversation about behaviour management using the coding in table 2 above.

Figure 3: Sample content analysis conducted on a single participant's thread of conversation.

> **T30 (mature male)** I agree with **T52**'s (mature female) ideas **(AXE - 4)** about promoting responsibility **(REI - 9)**. If the work is easy then the child should be encouraged to develop their own ideas further, through discussion with a partner. This should keep the child focused on the task for a while longer. The child should be taught about making the right choices **(DI - 1)**. Further to this idea of responsibility, the child could be made responsible for a small group to complete a given task. The child would become the leader of the group and it is their responsibility to keep everyone on track. The teacher should observe and intervene if their is any kind of 'poor leadership' or bullying, but should let the children overcome any difficulties they come across on their own **(A/CQ - 6)**. I have seen this approach used before successfully on a child that had similar traits to Jane. The child took responsibility for his group and was able to collate ideas and information from others (which he had not thought of) and used this information to succeed in the task **(GI+ 8)**. The child was not able to distract others because he was too busy gathering information and organising the group. The child was also able to identify other children in the group whom he clashes with and understood that it was important to not clash with them because he wanted his team to succeed **(E - 10)**. How did the child do this? **(AQ - 2)**. The child asked the child he clashed with to go off with their own small group and collect information themselves that was important to the task and then come back in a set time period. This prevented the two children from clashing. This happened in a year four class and in my view it was a bold play by the teacher to use this approach, but it worked and in the right setting I would use this technique in the future **(E - 10)**.

The data showed when a complete conversation was analysed that, at the start of the online discussion most students were verifying points made; asking for agreement; developing ideas; referring to earlier information or agreeing with another's

contribution without elaboration. As the conversation progressed the students began to ask questions and answer others contributions with an explanation, arguing or counter questioning and evaluating the conversation with respect to their own experiences; in some threads directly critiquing the information presented.

This change seemed to be hierarchal: starting with students approaching the conversation tentatively; the threads were rather descriptive and confirmatory as the students began to comprehend the knowledge presented. As the conversation gathered pace the students moved to evaluate and be analytical, at times critiquing each other's contributions. The patterns in the discussion fit with the theoretical aspects explored in the literature. Prosser and Trigwell (1999) referred to this reproduction of phenomenon by description as a surface approach. As the conversation progressed and the students gained in confidence they moved into analysis, a deep approach, with the intention of truly understanding the content of the conversation and to begin to solve the issues presented. Gibbs (1988) development of Kolb's Reflective Model (1984) described how through six stages learners move from planning, describing, feeling, evaluating, analysing and concluding; the content analysis showed how the students became more engaged in knowledge development through analysing and evaluating as opposed to describing, and these cognitive gains were demonstrated by students in their discussion as the conversation progressed.

This concurred with the student's perceptions of working in this way shared in their PQ responses. With each subsequent engagement online, student confidence grew and Salmon (2011) agreed that as this personal confidence grows as part of an online working group, enabling higher-level learning takes place. This was a feature of the content analysis data where students began to comprehend and elaborate on information given, to pose questions and give more detailed explanations justifying their thinking.

What was observed as part of the data fits with the view that, learning is a social process and that interacting and/or supporting one another facilitates a deeper learning. When the students participation during the online conversation as part of a learning community was analysed in more depth, it was stark in the evidence which students were actively engaged in reading and posting threads as part of the online conversation described by the researcher as 'core' participants; compared to those students who did not post but read the threads of conversation described by the researcher as 'peripheral' participants. This terminology was adopted from the research of Wenger et al. (2002) who first described these degrees of participation.

Determination of each student's level of participation revealed that seventeen of the students contributed to the core discussion with the maximum contribution to the online conversation being ninety-eight percent. Peripheral participants only represented approximately a third of the students (nine) involved and their maximum contribution to the online conversation was between two and twenty-one percent although one peripheral student contributed by reading comments sixty percent of the time. All core participants posted and read threads of the conversation (although the percentage of threads read varied). Peripheral participants only read threads and were not actively engaged in posting comments online for others to read and comment upon.

Supporting Children with Special Educational Needs: rising confidence

All students found sharing this knowledge online useful because 'we shared a range of views and discussed what worked well and what didn't' (mature male, T20). And 'it broadened my understanding and enabled me to empathise with the children' (female, T32). Twenty-three of the twenty-six felt it had altered their opinions. One student felt that it had not altered their opinion at all because they had a background working with children with specific needs (mature female, T31 - this concurred with a single response

on the background questionnaire). The researcher felt that this positivity and lack of trepidation in engaging online was because this way of working was no longer *new* as all students had already had the opportunity to work online as part of their studies with the first conversation on behaviour management, elevating most of the students' anxieties and enabling them to access the conversation from the start.

Students' planning for children's learning: improving competence

Students spoke about the value of the peer reviewing of planning online during subsequent face-to-face lectures and talked of the support to them in improving their plans in preparation to teach. There was a fifty:fifty percent positive to negative split in how students felt about peers reviewing planning using online communication tools. Students who had positive perceptions said, 'They could have time to process the information and formulate a response to improve or edit plans' (mature male, T5). They 'could confirm we had used the correct terminology' (mature male, T21), and the conversation 'aided my understanding of learning objectives and success criteria, and to become familiar with the lesson planning format' (female, T32). Negative perceptions about working in this way included 'trepidation about responses to my comments' (mature male, T30) and 'I don't like to feel like I am being judged by others' (female, T32). Anxiety amongst students had been heightened due to the content and purpose of the conversation and not the way the conversation was conducted (i.e. online). They had a sense of ownership as they were personally writing the planning, and felt that this peer discussion had much more of an impact on them individually. The researcher could empathise with those students who had negative perceptions, as they did not want to realise through the conversation that their planning required further development when compared to a peers plan. The peer review process was also subjective, as no one person in the conversation had a particular authority in terms of offering advice on planning –

so this first attempt at planning was higher stakes in terms of their personal feeling. If they had been critiquing an unknown participants plan the anxiety would have been less, so the administration of this activity is something the researcher if the activity was repeated would have to consider.

Self-assessment task: What can I do now? Confidence versus competence

The number of ideas gained online (co-constructed, underlined text) and represented in the students' brainstorms was greater in those working on the periphery (reading threads online only) these represented a mean percentage gain of 58.6. Those participating in the core activity (e.g. posting and reading online content) reflected a mean percentage gain of 48.1. The range of ideas gained between the two participating groups was very different too; the core group range was much larger with the lowest gain recorded at seventeen percent and the highest ninety percent (range of seventy-three percent). Whilst the peripheral groups range was lower at fifty percent with the lowest gain recorded as thirty percent and the highest of eighty percent. This contradicted the theoretical underpinning presented in the literature; when exploring the hierarchical notion of cognitive gain, it was expected (according to Wenger et al, 2002) to be higher amongst the core participants. One reason for this difference in data between the two groups that the researcher reflected upon was the way in which the knowledge was represented in a brainstorm and how the individual student may have interpreted the task. The researcher acknowledged that whilst all of the students received the same instruction for completing the brainstorm it was not objective and the instructions themselves were subject to individual interpretation and response to the task. The researcher considered whether the students were representing their knowledge accurately; individuals may have used different terms of reference for what they considered to be knowledge gained and how to represent this, opposed to what they

decided not to represent. The qualitative interpretation of what the students represented showed that those peripheral participants who read threads on behaviour management but did not post gained more knowledge, or reflected that to a greater extent in their brainstorms. Those involved in core activity that posted threads of conversation online appeared to state their current level of knowledge but read less of others contributions. They represented in their brainstorms that they gained less knowledge (or reflected it less effectively) during the self-assessment task.

Boud, Lee (2005) and Kear (2004) concluded that learning with peers through student-student interaction promotes the engagement with the course content and provides a depth to their learning. Corroborated by Biggs (1999) through earlier work he stated that students interacting with each other to familiarise themselves with course content deepened their cognitive understanding. This was true for the peripheral group: it was this co-constructed understanding that the students perceived they had gained and represented in the brainstorm.

Conclusions

It is important to note that the evidence of this small study shows that the peripheral students were not just talking or gaining insights from being good listeners (as described previously by Wenger et al., 2002) but were learning, making cognitive gains corroborated by student self-assessment. What makes this data unique is rooted in the evidence that in this particular study learning on the periphery of the online group is where most knowledge was gained (according to student self-assessment) and this was the smallest learning group. This is the opposite of the findings previously presented by Wenger et al. (2002) that the peripheral group would be the largest. The researcher acknowledges that this was a very small research sample and may not be generalisable

to a wider research population. When the bivariate data was plotted (Wessa, 2017) it enabled the online activity of students to be visually represented to show the groupings in terms of the intensity and proximity of their activity online. It is clear to see in this study that the core group were the largest group. The peripheral participants (nine students that did not author but predominantly read posts) are set apart from the core group, particularly the two overlapping points at the top of the plot. Peripheral students stated that they had not only learnt but would use this new knowledge in practice to support teaching and learning. Is it possible that the peripheral group learning had been accelerated? Spending the early parts of discussion *listening in* and building their confidence to engage deeply with the material then bridging to the core activity. This is why this small case study is significant for this particular group of students, and has the potential with further research to show impact on a much larger scale.

This research and evidence is important as it re-affirms the importance of blended learning approaches in HE. ITT students perceive that learning face-to-face supports theoretical learning. Conversely when real-life online problematised scenarios are explored virtually, limitless of time and space, students reflected that their situated knowledge and pedagogical awareness was developed in a positive way and gave them a confidence to use this in teaching practice which positively answers the research questions. Students with positive perceptions were generally those who participated as part of the core group during online discussions, although there were some exceptions. The evidence confirmed there were gains in student knowledge and self-assessment corroborated that they had learnt something new; where all students represented gains in knowledge ranging from seventeen to ninety percent. Furthermore they felt they would use this new knowledge when in school as part of their school practice and had gained a greater appreciation of the different views and pedagogical strategies available to them.

Students figuratively *dipped in and out* of the online conversation; they chose according to the topic and what they felt they had to contribute, whether to read and/or post (dip in) when the topic interested them or when to keep those contributions silent and to themselves (dip out). The students engaged superficially at the start of the conversation and as their confidence in their own knowledge increased they progressed to engage at a deeper level, analysing and critiquing each other's contributions. The peripheral participants whose perceptions were more negative prior to engaging online; reflected a higher gain in co-constructed knowledge and represented that more effectively during the self-assessment activity - boosting their confidence in their own ability to a greater extent than other students, as reflected in the data when compared to the core group. Core participants required retrospective reflection to realise the potential of the co-constructed knowledge; evidence showed that, they were more engrossed in sharing their current level of own knowledge with confidence from their initial positive perceptions, rather than focusing on the entire conversation and the contributions of others. Core participants read a lot of threads of conversation but at a superficial level. Peripheral students listened and read first, to gain confidence, but then engaged much more deeply with the content of the discussion and more importantly were able to recall that new knowledge and operationalize it in practice, as part of professional reflection, to improve their own practice as pre-service teachers. All participants had positive perceptions about the benefits of online communication to prepare them for assessed work.

What has been realised is that knowledge needs to be operationalised in a context through teaching practice for students to apply everything they have learnt and to have an impact on the learning of children in their care. That the online space was *safe* and has the ability to enable students to have agency over their personal knowledge

and how it will be used: particularly for those students in this case study that most frequently found themselves on the periphery of core learning. The evidence supports the notion that individual attributes can be shaped and contextual supports built up as part of the work conducted in the online space before the students are exposed to the realities of teaching practice; hopefully building a resilience to survive professional practice. Future research needs to look in more depth at the individual attributes and contextual challenges and/or supports of a much wider more representative group of ITT students, to be able to generalise about the positive impact(s) of online forums for professional dialogue to build confident, competent and somewhat resilient teaching practices when used in the context outlined herein.

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