**Discipline specific online mentoring for secondary pre-service teachers**

**Abstract:** This paper describes an online mentoring project which involved building online mentoring learning communities to support secondary pre-service teachers, and to provide them with the opportunity to interact and engage in professional learning dialogue with teaching professionals in their teaching disciplines. The practicing teachers took on the role of online mentors to the pre-service teachers who were personally, professionally and geographically isolated due to being located in regional, rural or remote areas. The goal was to develop discipline specific knowledge, skills and confidence in the pre-service teachers through ongoing electronic interaction with a discipline specific mentor. This paper describes enablers and inhibitors to online mentoring and identifies implications for implementation and suggestions for improvement.

**Keywords:** Online mentoring; group mentoring, secondary pre-service teachers; content analysis framework

1. **Introduction**

In their review of teacher education and school induction in Queensland, Australia, Caldwell and Sutton ([August, 2010](#_ENREF_3)) stated that “induction is a process that commences from the time a student enters a pre-service program and continues for at least a year after he or she enters the profession” (p. 93). They also recommended that “[t]eachers entering the profession have at least one trained mentor for at least the first year of their employment” (p. xxi).

The leading reason for teachers leaving the profession is the lack of support ([Buchanan, 2010](#_ENREF_2); [Roberts, 2004](#_ENREF_31); [Scheopner, 2010](#_ENREF_32); [Schuck, Aubusson, Buchanan, Prescott, Louviere, & Burke, 2011](#_ENREF_34)). The lack of support is heightened for those located in rural or remote locations where there are fewer experienced teachers in their geographical location. For secondary discipline specialist teachers, access to teachers with knowledge in their discipline area is even more problematic. In order to compensate for the “decreased contact and networking with teachers in the same subject area from other schools” ([Roberts, 2004, p. 10](#_ENREF_31)) a one-to-many secondary discipline specific online mentoring program was established.

The research questions for the project were:

* How do pre-service teachers and teachers respond to online mentoring?
* What types of cognitive processes do pre-service teachers’ exhibit within online mentoring?
* What types of communication do the mentors and mentees have in the online community mentoring space?

Established definitions of mentoring espouse a mentor who is older and more experienced and works in the same field as the mentee, or it “generally denotes a supportive relationship between an older, more experienced person and a younger protégé that serves to initiate her into a new profession, organization, or stage in life” ([O'Neil, 2002, p. 35](#_ENREF_28)). In a literature review of group mentoring, Huizing ([2012](#_ENREF_17)) synthesised that “[m]entoring provides the capacity to learn wisdom and experience from another who has *been there and done that*” (p. 27). This traditional hierarchical form of mentoring has now been overtaken by more contemporary views of mentoring, including peer, collaborative, and collegial relationships rather than being limited to a senior person ([Hew & Knapczyk, 2007](#_ENREF_16)).

Online mentoring, also referred to as E-mentoring, tele-mentoring, cyber-mentoring or virtual mentoring ([O'Neil, 2002](#_ENREF_28); [Stewart & McLoughlin, 2007](#_ENREF_38)), has been defined as the "use of e-mail or computer conferencing systems to support a mentoring relationship when a face-to-face relationship would be impractical" ([O'Neil, Wagner, & Gomez, 1996, p. 39](#_ENREF_29)). The primary contact is through electronic communication as the medium for dialogue for the purposes of developing the skills, knowledge and confidence of the mentee ([Single & Single, 2005](#_ENREF_36)). Having the mentoring occur asynchronously online provides the participants with “time to structure and organise their thoughts” ([Cheng, Paré, Collimore, & Joordens, 2011, p. 253](#_ENREF_5)) and it also provides opportunities for participants to reflect on and share their past experiences, knowledge developed within course work, and their experiences during their professional experience placement. An online group mentoring space provided exposure to multiple perspectives and by articulating their thoughts and stories the participants actively construct and reconstruct meaning ([Liu & Yang, 2012](#_ENREF_22)) at the individual and group levels.

A number of different forms of mentoring were introduced by Eby ([1997](#_ENREF_8)). These included lateral or peer mentoring with the participants being at similar levels in the same or different organizations; and internal or external manager/sponsor mentoring where the mentor is at a more senior level than the mentee. Traditionally mentoring has been enacted and researched from a hierarchical dyadic perspective. However, as suggested by Huizing ([2012](#_ENREF_17)) “[i]f one of the goals of mentoring is to secure the wisdom and experience of others” (p. 27) alternative types of group mentoring should be explored. The Transforming Teacher Education Through Clinical Practice report suggested that pre-service teachers would benefit from participation in a virtual and interactive professional community and that there is a “shared responsibility for teacher preparation” ([National Council for Accreditation of Teacher Education, 2010, p. ii](#_ENREF_27)).

Group mentoring can be defined as having multiple mentors and mentees in the same setting where “learning is individual and each mentee works on his or her own unique learning needs and development goals” ([Carvin, 2011, p. 50](#_ENREF_4)). Carvin ([2011](#_ENREF_4)) further suggested that the “group is a safe and confidential environment for both mentees and mentors to explore and share personal challenges” (p. 50). Dansky ([1996](#_ENREF_7)) identified that “group-level mentoring emerges from the dynamics of the group as a whole, rather than from a relationship with one specific person” (p. 7). This is affirmed by Kopcha and Alger ([2014](#_ENREF_20)) who suggested that “[d]ialog helps learners better understand the meaning of knowledge and its relationship with the social and cultural norms” (p. 49) and that while supervising teachers find it difficult to provide meaningful feedback to pre-service teachers; timely feedback and coaching can be provided through group online discussion. They also revealed that pre-service teachers and practicing teachers who contribute to online discussions have better teaching and learning outcomes due to the increased “exposure to expert feedback and thinking” ([Kopcha & Alger, 2014, p. 55](#_ENREF_20)).

Where work teams are used in workplaces, intra-team mentoring has become popular, as is group professional association mentoring ([Eby, 1997](#_ENREF_8)). Other types of group mentoring which have been introduced by Huizing ([2012](#_ENREF_17)) include peer group mentoring, one-to-many mentoring, many-to-one mentoring, and many-to-many mentoring.Limbert ([1995](#_ENREF_21)) has identified a number of advantages of group mentoring including: (a) flexibility, (b) inclusiveness, (c) shared knowledge, (d) interdependence, (e) broader vision of the organization, (f) widened external networks, (g) provided a safe place, (h) developed team spirit and skills, (i) personal growth, and (j) friendships.

In addition, contemporary researchers have identified numerous opportunities and challenges for online mentoring ([Eby, 1997](#_ENREF_8); [Ensher, Heun, & Blanchard, 2003](#_ENREF_11); [Gutke & Albion, 2008](#_ENREF_13); [Headlam-Wells, Gosland, & Craig, 2005](#_ENREF_14); [Kasprisin, Single, Single, & Muller, 2003](#_ENREF_19); [McLoughlin, Brady, Lee, & Russell, 2007](#_ENREF_25); [Mueller, 2004](#_ENREF_26); [Stoeger, Duan, Schirner, Greindl, & Ziegler, 2013](#_ENREF_39)). These researchers have indicated that opportunities provided by online mentoring include:

* Enhanced access to mentoring opportunities because participants are not bounded by geographical constraints;
* Convenient access as most people now have their communication device in their pocket/handbag in the form of a smart phone;
* Reduced costs in time and money, no travel required or time away from job;
* A written record of interactions to be viewed/reviewed over time;
* Flexible access at time convenient to participants and minimizing disruption to their daily commitments;
* Reduced impact of status in the mentoring relationship, less threatening, anonymity encourages mentee to ask questions not likely to ask in person;
* Enriched opportunity for open and supportive relationships and friendships across boundaries of space and time;
* Decreased pressure of an immediate response, asynchronous interactions provide time for the response to be more reflective;
* Enhanced opportunity for mentees to take responsibility for initiating contact and to play an active role in the discussion;
* Improved benefits to those skilled written communicators or those who are shy in person; and
* Increased awareness of issues of privacy and confidentiality when online.

In contrast the same researchers identified challenges of online mentoring. Table 1 provides a summary of these disadvantages which are comprised of weaknesses in traditional face-to-face mentoring in addition to elements related to the online space.

**Table 1**

Challenges of Mentoring

|  |  |
| --- | --- |
| **Challenges of traditional mentoring (and online mentoring)** | **Challenges of online mentoring** |
| * Lack of availability of suitable mentors * Ongoing management, planning, implementation, training and monitoring of the mentoring process * Ongoing commitment from all parties * High quality interpersonal relationships, requires mentor to deal effectively with the mentee on an interpersonal level (such as communicating, providing feedback, and empathizing) * Synchronous mentoring (either face-to-face or online) is more time-consuming and involves scheduling issues | * Ongoing access to and technical skills with digital device and internet * Requires competency in written communication * Slower exchange of information and less rapid relationship development in asynchronous mentoring * Potential for miscommunication due to: lack of non-verbal cues; may be perceived as a cold medium; participants may misunderstand attempts at humor, misread tone, or fail to clarify when they do not understand one another * Technological malfunctions detract from the momentum of the relationship and cause lapses of communication * Disinhibition, flaming, and mentor neglect more prevalent online |

This paper will discuss an online mentoring project established for rural and remote pre-service teachers. Groups of pre-service teachers within the same discipline were joined by an experienced teacher in the same discipline in an online space. This project capitalized on the use of technology to provide support for pre-service teachers as they developed their own pedagogical content knowledge and approaches. It is argued that group online mentoring can provide rural and remote pre-service teachers with enhanced opportunities to be supported while they explore and build an understanding of the complex world of teaching and learning within their disciplines.

Previous research on pre-service teacher mentoring concentrates on face-to-face mentoring or generic mentoring processes. This research builds on the previous research but focuses on the outcomes of group mentoring in an online space. The research will explore how the participants communicate and respond to online mentoring and the cognitive processes that pre-service teachers’ exhibit within an online mentoring space.

1. **Computer Conferencing and Content Analysis Conceptual Framework**

The use of computer conferencing or asynchronous online discussion allows discussions to continue for a longer period of time, at any time, any place and with more participants at the same time, than traditional mentoring conversations or meetings. By analyzing the content of these messages, facilitators can “offer immediate support to the individual and the collective learning process” ([Henri, 1992, p. 118](#_ENREF_15)). The content analysis framework provides educators a process for understanding the process of learning and it also “appears capable of promoting and supporting a collaborative learning process” ([Henri, 1992, p. 117](#_ENREF_15)).

Henri’s ([1992](#_ENREF_15)) Computer Conferencing and Content Analysis framework has five dimensions which are presented in Table 2 below, along with categories and indicators to describe each dimension. Early research in the online area used quantitative approaches and measured the number of messages, number of lines or words per post etc., however, this does not provide an “accurate picture of student participation” (Henri, 1992, p. 124). To focus on the process of learning in the online discussions, rather than the product, this study used a qualitative approach and takes “a cognitive view of learning” (p. 123) and “analyses the interactive exchanges” (p.122).

**Table 2**

Dimensions and categories for content analysis, modified from Henri ([1992](#_ENREF_15))

|  |  |  |
| --- | --- | --- |
| **Dimension** | **Category** | **Examples/Indicators** |
| Participative | Overall | Quantitative data supplied by server |
| Active participation in learning process | Statements related to formal content |
| Social | Social dynamics | Self-introduction  Verbal support |
| Interactive | Explicit interaction | Explicit reference to another message or person |
| Direct response | “…in response to Denis’s message…” |
| Direct commentary | “…I share Nicole’s opinion” |
| Implicit interaction | Implicit reference to another message or person |
| Indirect response | “I think the solution is…” |
| Indirect commentary | “The program under discussion…” |
| Independent statement | “After examining the problem, I think that …” |
| Cognitive | Surface processing | Repeating information without inference, interpretation, or new additions  Sharing an opinion without adding more  Proposing solutions without explanations  Making judgment without justification |
| In-depth processing | Linking facts and ideas to interpret, infer, propose and judge  Offering new information  Generating new data by hypothesis and inference  Proposing solutions with justifications  Establishing advantages and disadvantages  Providing proof or supporting examples |
| Metacognitive | Knowledge of person | Comparing oneself to another  Being aware of one’s emotional state |
| Knowledge of task | Being aware of one’s way of approach the task  Knowing whether the task is new or known |
| Knowledge of strategies | Using strategies to acquire knowledge  Metacognitive strategies aimed at self-regulation of progress |
| Evaluation skills | Asking whether one’s statement is true  Commenting on one’s manner of accomplishing a task |
| Planning skills | Predicting the consequences of action  Organising aims by breaking them down into sub-objectives |
| Regulation skills | Redirecting one’s efforts  Recalling one’s objectives |
| Self-awareness skills | “I’m pleased to have learned so much …”  “I’m discourage at the difficulties involved …” |

For the purposes of this study the cognitive dimension will be broken down into the two categories of Surface and In-depth as described in Table 2 above to provide a more detailed analysis of the participants’ contributions. Archived posts in the online mentoring space will be analysed using this Computer Conferencing and Content Analysis framework ([Henri, 1992](#_ENREF_15)).

1. **Context and method**

An online mentoring environment was established for secondary pre-service teachers to deeply probe personal and discipline-specific issues, along with exploring the relationships between experiences they have observed or participated in while on professional experience, and the theoretical components of pedagogical and curriculum courses. The online mentoring project was established to reduce the barriers that prevent pre-service teachers in rural and remote locations from obtaining a mentor or access to a discipline expert beyond their professional experience supervisor.

Participants included mentees who were secondary pre-service teachers from the four year Bachelor of Education (BEDU) Secondary specialisation across all year levels, and also the one year Graduate Diploma of Learning and Teaching (GDTL) Secondary specialization in a regional university; and mentors who were experienced teachers within secondary schools in Queensland, Australia. The majority of the mentees were in their second year of a four year BEDU. The initial teacher education programs were offered online and there were pre-service teachers located in many rural and remote areas. Due to a range of circumstances, these pre-service teachers were unable to move to locations which offered them less professional isolation. Pre-service teachers located in rural and remote locations do not have the opportunity to interact and engage in a professional learning dialogue with teaching professionals within their disciplines, for example, often there is not a specialist Physics teacher in a small rural high school.

Secondary pre-service teachers were invited to participate and their involvement was not associated with learning activities or assessment in any course. The mentors were volunteers and were paid a minimal honorarium for their participation as mentors, and they were available for eight months. Mentees were able to interact with mentors from both of their teaching areas. The practicing teachers acted as online mentors for the pre-service teachers who were personally, professionally and geographically isolated due to being located in regional, rural or remote areas. In this project, group mentoring was a one-to-many relationship where there was only one mentor for each discipline, with many pre-service teachers. The participants included 10 mentors and 50 mentees.

The mentees and mentors interacted in forums through Wikispaces (http://www.wikispaces.com/). Wikispaces was selected to facilitate the online conversations because it was not blocked by firewalls at schools, and was accessible at the university, and the homes of both the mentors and mentees (unlike some of the platforms explored for the project). Each discipline area had a separate and specific area for the discussion with a discipline specific mentor. All areas were open areas, meaning that all pre-service teachers could view all of the discussions. There were ten different discipline areas in all: Business, Computing, English, Health and Physical Education (HPE), Industrial Arts, Languages other than English (LOTE), Mathematics, Sciences, Social Sciences, and The Arts. The mentees were requested to post at least three times during the two semesters of the project.

This project used mixed methods approach for data collection and analysis. Data collection tools included archived online discussions, interviews, and online pre and post surveys. The online discussions were analysed to identify the levels of interactivity, cognition and metacognition of their posts within their online discussion using Henri’s ([1992](#_ENREF_15)) Content Analysis Framework. Cognitive presence reflects the intellectual climate and critical thinking within the learning. It is concerned with the construction, reconstruction and confirmation of meaning ([Garrison, 2003](#_ENREF_12)). After the completion of the year and finalization of results, the online discussion posts were downloaded and de-identified by a research assistant.

The archived online discussion posts were analysed using established protocols for content analysis of discussions and were mapped against Henri’s ([1992](#_ENREF_15)) five dimensions discussed previously. In a meta-analysis of research of content analysis coding schemes, Weltzer-Ward ([2011](#_ENREF_42)) explored the units of analysis employed by researchers and the overwhelming majority of the research indicated that “the post, the unit presented by the discussion participant, is most appropriate for reliable and valid analysis” (p. 70). This occurred irrespective of the length of the post, because single posts might range in length from a phrase to a number of pages.

An online survey was administered to the mentees at the beginning of the mentoring program, and to the mentors and mentees at the end of the program. The online surveys included questions relating to demographics, expectations and experiences of the program, accessibility of the mentor/mentees, levels of enjoyment, and issues related to the online mentoring experience.

Within the program, the role of the mentors was to provide advice and feedback, to share stories or resources, and to provide moral support for the mentees. The mentees were requested to use the space to enhance their content and pedagogical knowledge of their disciplines, and to ask questions to enhance their personal and professional learning. The role of the researcher was to establish the online space, including an image and short bio of each mentor, to encourage initial dialogue between the mentor and mentees, and to build and encourage relationships based on trust. During the project, when it was noticed that little discussion was taking place, the researcher inserted stimulus questions to promote participant response and to stimulate more in-depth dialogue. This occurred three times during the eight month period of the mentoring project.

The online survey gathered qualitative and quantitative responses and was developed based on the outcomes from Ehrich, Tennent and Hansford’s ([2002](#_ENREF_9)) study. Additional data came from participant interviews, where three pre-service teacher mentees and five teacher mentors consented to be interviewed by phone. The open-ended questions from the survey and the interviews were reviewed to identify recurring themes or patterns under the constant comparison method ([Wellington, 2000](#_ENREF_41)).

1. **Results and Discussion**

The majority of the participants (70%) were females enrolled in the BEDU program. The age of the mentee participants ranged from 18 – 60 with a small reduction of participants in the age group 42 – 60 but no other discernable difference in age grouping. The majority of the pre-service teachers were enrolled as Social Science, English, Mathematics, or Science majors with HPE being the next most common teaching area. This was not unexpected given they are the five areas that are compulsory in junior secondary schools in Queensland.

*4.1 Online discussion archives*

There were 578 posts during the eight-month period of the project, which suggested an average of 9.6 posts per participant over the project life. However, there were 12 832 views from the participants over the period of the project; this was a large number of views for only 60 participants. Many of the participants were lurking in the space rather than, or in addition to posting. In total 33 of the 50 pre-service teachers posted over the timeframe. The views were made up of the 33 pre-service teachers who posted, the 10 mentors and the 17 pre-service teachers who didn’t post. “[L]urkers have regular but peripheral participation in that they are regularly in the online space but are in ‘read only’ mode” ([Redmond, Devine, & Bassoon, 2014, p. 123](#_ENREF_30)). The authors go on to suggest that “students who ‘lurk’ in online discussions have the ability to learn just as effectively and efficiently; even when not actively participating in the dialogue” (p. 123). Whereas Cheng et al., ([2011](#_ENREF_5)) have suggested that any “benefits associated with lurking would depend on the richness of the post content” (p. 254). Given the large number of views it could be postulated that the participants found the content of the posts rich or meaningful enough for them to return again and again. Singh and Holt ([2013](#_ENREF_35)) hypothesized that “beginners are initially peripheral … and there needs to be opportunities for learners to observe and then … move them into more “legitimate” participation” (p. 101). Perhaps this is why there was a large number of views and significantly fewer posts contributed by participants, especially at the beginning of the project. Matzat ([2013](#_ENREF_23)) used the term *free riding* to describe when members don’t contribute and the level of discussion is reduced. In this case, it would be impossible for the mentors and the researcher to see ongoing development of the mentee and to diagnose possible misconceptions if they are *lurking* or *free riding*. An alternative explanation for the low number of posts could be because of the lack of external requirements.

In this project there was no external incentive to post to the mentoring forums e.g., no assessment mandate. Wei, Peng and Chou ([2015](#_ENREF_40)) have suggested that having scores allocated to the quantity and quality of postings would maintain “active participation” (p. 17). An analysis of the dates for posting indicated that the participants received timely responses to their posts from the mentor and the other mentees. Within three days of a mentees question or comment there was a number of responses from the other mentees and the mentor.

The participants’ contributions to the discussions were not consistent over time as indicated in Figure 1. The start of the semester was in the beginning of March and the first month had limited posts and views. Perhaps this is because the pre-service teachers were waiting to see what the norms for the space. The largest number of views and posts were in the three months July, August and September. For this context July was the start of a new semester and after viewing the May and June posts the facilitator seeded discussion topics at the end of June and in the beginning of July. This may have resulted in the increased activities during that time. The increased posts may also have been due to the fact that at the beginning of the semester students have less assessment due and they found the time to contribute during that period or they were more confident to contribute.

**Figure 1**

Online Participation of Pre-service Teachers

The key topics for discussion were viewed through the lens of each discipline and included literacy across the curriculum, use of ICTs, motivation of students, engagement and attention, homework, vocational education, professional experience, making the content of the discipline relevant, discipline relevant extra-curricular activities, critical thinking, and the embedding of indigenous perspectives. The discussions about homework, literacy and student engagement were seeded into the discussion by the researcher, initially to start the discussion and then during the project when discussion seemed to fade: at the end of the first semester and at the beginning of the second semester. Perhaps the other topics were of interest due to the pre-service teachers’ experiences while on professional experience placement or content in courses they were studying. The discussion topics were introduced by the pre-service teachers as being of interest to them and their participation both as a mentee and co-mentor resulted in the learners constructing the content and resources in the online space with the teacher mentor. This resulting just-in-time discussions and sharing of resources aligned with the research of Clark ([2009](#_ENREF_6)) who suggested that online communities have the potential to support and enhance pre-service and beginning teachers.

Table 3 provides a summary of the types of participants’ posts. Less than 1% of the posts were coded as *Social*. Social posts are those that develop trust and interpersonal relationships, express emotions and provide insight into people but are not related to content. It was very surprising that there were so few social posts, even from the mentors. It was noted by the researcher that the posts coded as social were very short in length, and included short paragraphs.

**Table 3**

Results of discussion posts analysis using Henri’s ([1992](#_ENREF_15)) content analysis framework

|  |  |  |
| --- | --- | --- |
| **Dimension** | **Number of posts (n = 578)** | **Percentage of posts** |
| Social | 5 | <1% |
| Interactive | 84 | 15% |
| Cognitive – Surface | 372 | 64% |
| Cognitive – In-depth | 111 | 19% |
| Metacognitive | 10 | 2% |

Posts coded as cognitive posts at the surface level included posts where the participants were making generalizations, minor reference to literature without elaboration, and making unsubstantiated claims. Cognitive posts at the surface processing level made up 64% of the total posts. This is in contrast to the results found in a study by McKenzie and Murphy ([2000](#_ENREF_24)) who reported a 22% response at the surface processing category. The length of the surface posts range widely, from quite short, one paragraph, to one page (when printed).

In-depth cognitive posts included those posts where the participants attempted clarification and interpretation, made inferences, defended solutions, provided multiple perspectives, and used the literature to support a perspective. The cognitive posts at the in-depth processing level accounted for 19% of the posts. Again this result is divergent from McKenzie and Murphy ([2000](#_ENREF_24)) who reported 67% of the posts as demonstrating deeper levels of processing. The lengths of in-depth posts were much longer than other posts, many at the 2 – 3 page length. The researcher noted that the pre-service teachers’ initial response to stimulus was more likely to be coded at the in-depth cognitive level, whereas responses to others were more likely to be at an integrative or surface cognitive level.

Interactive posts made up 15% of the posts, and it included posts that were in direct response to others, often making commentary on their response or adding agreement type statements. This result is very low when compared with McKenzie and Murphy ([2000](#_ENREF_24)), who found that in their study 74% were classified as interactive posts. Perhaps it was because the pre-service teachers were waiting for the online mentors to comment, and after the mentor commented the post-response cycle did not continue. These posts tended to be short in length, at about 1 – 2 paragraphs.

Metacognitive posts included those which demonstrated self-awareness, past successes, and discussion of evaluation of personal learning or learning processes. Only 2% of the total posts were coded as metacognitive, compared to 16% in the McKenzie and Murphy ([2000](#_ENREF_24)) study. These posts tended to be 1 – 3 long paragraphs. Metacognition may have been improved if the researcher designed specific stimulus activities which promoted metacognition.

*4.2 Survey results*

32 pre-service teachers (out of 50) completed the online pre-survey. From the pre-survey the majority of the mentees (76%) expected to access the mentor once a week within the online space. The post-survey indicated that the majority of the participants accessed the online space every few months (38%) or once a month (29%) and not weekly (24%) as indicated in the pre-survey.

Pre-service teachers could nominate three reasons for their involvement in the online mentoring project. They expected that the benefits of participating in this mentoring program would be: to gain increased knowledge about teaching their disciplines in secondary schools (67%); to bridge the gap between university and the workplace (47%); to collect increased resources to use when teaching (43%); to improve their interpersonal skills (40%); and to gain an enhanced attitude about the teaching profession (40%).

25 participants completed the post survey. When asked what the mentees gained from the mentoring experience in the post-survey the top four responses were very similar to the pre-survey results about their expectations of the mentoring experience. The pre-service teachers indicated they gained knowledge about teaching their disciplines (58%); bridging the gap between university and the workplace (47%); collected resources (37%); improve their interpersonal skills (21%); and gain a reality check about the teaching profession (21%). Perhaps the alignment between their expectations and their perceived gains was because the mentee participants directed discussion towards these specific areas of need. These results, aligned with Hew and Knapczyk’s ([2007](#_ENREF_16)) study, where the mentors contributed to the mentees professional development. The online mentoring wikispace was also useful in building a collective library of teaching resources relevant for the discipline, this outcome paralleled the result of Clarke ([2009](#_ENREF_6)).

When the mentees were asked for three things they enjoyed about the online mentoring projects, they nominated: advice from peers and an expert (64%); the ability to discuss/share project/ideas (55%); and gaining help with strategies/subject knowledge/resources (45%). It is interesting that these were the top choices given they have the opportunity to discuss the same items within their university courses which all have online discussion spaces. It appears that the inclusion of the mentors gave more credence to the discussions when compared to course specific discussions.

The mentors identified that they enjoyed the opportunity to reflect on their own development; gaining an insight into other’s roles; opportunity to network and share ideas and resources; and their own professional development as the most common reasons for enjoying the project. This finding is consistent with that of Hew and Knapczyk ([2007](#_ENREF_16)) and Ehrick, Hansford and Tennent ([2004](#_ENREF_10)) who reported that the online mentors can also benefit from the mentoring relationship.

In an open-ended post survey question and in the interviews, the participants overwhelmingly identified that the fact that the mentoring was online was a significant enabler for the project. They commented that the online environment *enhanced [their] ability to participate*, *was easy to use*, and enabled *access at a time and place that was convenient* to the participants. This online mentoring harnessed the potential of technology to improve access to information and networking opportunities with experienced teachers. This means that the pre-service teachers could access mentors from any location rather than those in their local area and could develop relationships with practicing teachers in their discipline.

One pre-service teacher indicated that there were some contradictions in their lived experience verses the advice provided by the expert: *Having been employed as a school officer for over five years, I also found information given was either very contradictory to my first-hand experiences or was information I was already privy to.* In contrast Hunt et al. ([2013](#_ENREF_18)) claimed that “e-mentoring promotes points of view outside that of the teacher’s immediate context, [and] enables a teacher to consider multiple solutions to classroom problem situations” (p. 288). The benefit of online group mentoring is that it provides multiple perspectives, encouraging pre-service teachers’ to acknowledge that their personal experiences as a learner or teacher is not the same as other learners or teachers in other contexts.

The mentees identified that a significant inhibitor for the project was the lack of mentors’ time which resulted in reduced support and guidance for them. This is similar to the outcome of a study by Ehrich et al. ([2004](#_ENREF_10)), and Hunt et al. ([2013](#_ENREF_18)), who found that “concerns were expressed regarding the lack of posts by all participants” (p. 294).

The final question asked the participants to suggest how the online mentoring could have been improved. Not surprisingly, a number of pre-service teachers indicated *greater input from the mentor* as the element which would have made the biggest difference. In the mentee survey 55% of the mentees indicated that lack of mentoring time impacted on the quality of the mentoring experience. The mentor survey also indicated that lack of time impacted on their ability to engage in the mentoring process. When analysing the online discussions, the researcher did notice that the pre-service teacher mentees often took on the role of co-mentor, sharing their experiences and suggesting resources etc. in a similar way to the teacher mentors.

The participants also suggested the inclusion of more *than one mentor for each subject area and the establishment of synchronous communication, especially during the early stages* of the project. Mentors also suggested initial synchronous contact stating *[p]erhaps a physical meeting with the pre-service teachers at the start would be good, Skype could work for more remote pre-service teachers.* This aligned with the thoughts of Hunt, Powell, Little and Mike ([2013](#_ENREF_18)) who expressed that “e-mentoring can provide synchronous and asynchronous mentoring opportunities which increase collaboration time and reduce feelings of isolation and increases efficacy among new teachers” (p. 286). Another suggestion was to have the *[a]bility to contact mentors individually rather than through an open forum* and finally*, the consideration to embed [the project] into different courses.*

This one-to-many mentoring relationship within this project enabled pre-service teachers to hear from their peers in addition to their mentor, all of whom shared discipline or content expertise. This study affirmed the outcomes from Stanulis and Floden’s ([2009](#_ENREF_37)) study within the United States which suggested that mentoring provided “an opportunity to share ideas, resources, and advice; an opportunity to hear from other new teachers who were going through similar struggles; and the increased openness to try new things in their practice” (p. 119). However, this project provided discipline specific mentoring for secondary pre-service teachers and the mentoring occurred beyond a professional experience placement.

The Australian Professional Standards for Teachers require pre-service and experienced teachers to “6.3 Engage with colleagues and improve practice”; and “7.4 Engage with professional teaching networks and broader communities” ([Australian Institute for Teaching and School Leadership, 2012](#_ENREF_1)). The online mentoring project provided both the mentors and the mentees the opportunity to explicitly demonstrate these standards.

1. **Implications**

A number of implications arise from the study. Firstly, successful online community mentoring can occur in open online spaces, however open online mentoring spaces where posts are open for all participants to view *may* alter the depth and breadth of the mentoring conversations, when compared to closed online mentoring spaces. Whatever online environment is selected, it must be sustainable and not be restricted by firewalls at different locations.

Secondly, it would be useful for the mentoring organizer to have initial synchronous contact with the mentees and mentors to discuss expectations and access or use of the online mentoring environment. In addition to this, it would be a recommendation that the mentoring facilitator monitor engagement, and send monthly email reminders to the mentors or mentees. These were also recognised as a strategies to improve outcomes by Stoeger et al., ([2013](#_ENREF_39)). The facilitator could also create stimulus posts that encourage the mentees to respond at in-depth and metacognitive levels, increasing the cognitive engagement by the pre-service teachers.

Thirdly, it would be useful for the mentoring groups to have initial synchronous discussion prior to moving to asynchronous conversations, in order to develop relationships and trust. This could occur either face-to-face, in Skype, Blackboard Collaborate, or another video conferencing facility.

Finally, to create a sustainable online environment for discipline specific dialogue for secondary pre-service teachers, it is important to develop a network of discipline specialists who are interested in supporting rural and remote pre-service secondary teachers. The selection of mentors should be based on experience, social competence and online confidence and competency. These last recommendations align with the work of Schichtel ([2010](#_ENREF_33)), who revealed that “developmental, social and cognitive competencies were important e-mentoring components independent of time and space with the combination of interactive and reflective characteristics that seemed to stimulate and facilitate higher-order learning” (p. e254).

1. **Conclusions**

This paper built on previous research by aligning secondary pre-service teachers located in rural or remote locations with other pre-service teachers and a mentor aligned with their focus disciplines. In a world where there is an increased focus on teacher quality this research provided pre-service teachers in the same discipline the opportunity to make meaning, receive feedback and share experiences with experienced teachers, who are discipline specialists, as a way to improve their teacher preparation. In answering the research questions, the mentors and mentees commented that their participation in the group mentoring was a very positive experience. The majority of the online posts were in the surface processing of the cognitive dimension of Henri’s ([1992](#_ENREF_15)) framework. The mentees were involved in the program to gain increased knowledge about teaching their discipline, to bridge the gap between university and the workplace, to gain increased access to resources, and as a reality check for the expectations of the profession. The self-reported perceptions of the mentees in the post survey indicated that the program was successful in achieving these aims.

There is limited opportunity to make generalizations from the data as it was collected from one regional university, with secondary pre-service teachers self-reporting their perceptions of the mentoring experience. Future research in this area could explore online mentoring from teacher education programs at a number of universities, or online mentoring for undergraduate students in other disciplines. The data collected could identify issues that rural and remote pre-service teachers have in terms of access, participation and engagement due to their professional and geographical isolation. In addition the study could be expanded to beginning teachers located in rural and remote locations.

Online community mentoring can be successful in supporting secondary pre-service teachers, particularly those located in regional, rural or remote centers. The one-to-many group mentoring enables mentoring facilitators to leverage several mentors across a greater number of mentees while still building mentees knowledge, skills and confidence; developing talent; and providing a safe place for mentors and mentees to explore the changes of teaching in contemporary digital and diverse classrooms.

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