Untangling the Web of Influences on Dental Students’ Participation in Interprofessional Education Programs

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Abstract: The aim of this study was to explore how dental students involved in an experiential interprofessional education (IPE) program in New Zealand made sense of engaging in this unfamiliar learning environment. Qualitative data gathered from students during group interviews were analyzed to better understand how they assessed the IPE experience. Interviews were audio-recorded and transcribed before analysis of students’ comments was undertaken, using constant comparison analysis and taking an inductive approach to the initial coding. Once each of the investigators had gone through his or her own transcripts, they reviewed each other’s coding and agreed-upon categories before applying the 3-P model of student learning. Over a three-year period (2012-14), 16 focus groups were conducted with students from multiple health professions. In total, 24 dental students participated. Six categories of comments made in the focus groups were identified: expectations and realizations; not practicing; trade-offs/losses; learning with, from, and about each other; becoming open to a different clinical experience; valuing dental students’ participation in IPE; and learning about what dentists do. From these categories, three main themes emerged: becoming a dentist, negotiating IPE experience, and valuing dentistry. The 3-P model highlighted the complexity of IPE, and the challenges suggested that dental students may need extra preparation prior to participating in IPE programs.

In New Zealand, predoctoral dental education is provided in a distinct and separate educational program in health sciences divisions that include biomedical sciences, medicine, pharmacy, and physiotherapy. This structure is not unlike the education of dentists in other countries. In the last decade, however, there has been a trend towards interest in having individuals in the various health professions learn with, from, and about one another in order to improve collaboration and the quality of patient care.1,2 This intentional educational process is commonly known as interprofessional education (IPE). Impediments to IPE may include organizational structure, fragmentation of the health care sector, lack of policy, curricular demands for each discipline, professional silos, and lack of student enthusiasm.3 Key identified enablers are support from higher or other levels in the organization, specifically organizational endorsement; pragmatic curricular alignment and targeted funding for IPE;4,6 guidance from interprofessional role models; and professional development.7,8 Increasingly, there has been an emphasis in dental education on preventive oral health care and the importance of working with an expanded dental care team in a collaborative practice environment.9 These considerations, as well as an appreciation of the value of dental students’ interacting with students from other health professions, led the Faculty of Dentistry at the University of Otago, New Zealand, to accept an invitation from the government of New Zealand to be part of a predominantly clinically based, experiential IPE program. This invitation provided the opportunity for the Faculty of Dentistry to align its IPE goals with the strategic direction of the university’s Health Sciences Division. The government’s aim in funding this pilot project was to
The students in the IPE program were initially drawn from the health professions schools at the University of Otago along with nursing students from Eastern Institute of Technology. The program then expanded to include dietetic students from Otago University and occupational therapy students from Otago Polytechnic. The program, called the Tairawhiti Interprofessional Education Program (TIPE), has been described elsewhere. Briefly, the program is designed for final-year students in each health profession and consists of sequential five-week residential immersion in predominantly clinical placements throughout the year in a rural location. All students are exposed to IPE in a rural and indigenous peoples (Māori) health context, for which long-term condition management is the selected clinical focus. Dental students have the choice of a Māori community dental placement or TIPE as part of their final-year studies, and students are prepared for the program by Faculty of Dentistry staff and orientation information before and on arriving at the program.

The TIPE program offers the opportunity for health professions students to practice and be assessed in meaningful, real-world contexts that have a very powerful impact on learning. However, early evaluations of TIPE found that the dental students struggled to engage actively in this experiential program. Dental students’ lack of enthusiasm for the program highlighted factors that may inhibit learning and that, therefore, needed to be identified and addressed. In part, this struggle may have been anticipated since working with other health professions represented a major change for the dental students. Students seeking degrees in all the health professions have clear expectations of what they should learn, the importance of that learning, its perceived relevance to practice, and what experiences they can expect during their studies. Dental students expect to become competent practitioners by taking courses in biological sciences and learning to diagnose oral problems, undertake comprehensive clinical examinations, and perform dental procedures. Unlike students in other health professions, dental students at the University of Otago begin hands-on practice with patients from a very early stage of their curriculum (year 2), whereas the other students do not perform specialized technical tasks until the early postgraduate years.

These sorts of learning-related characteristics are called “student presage factors,” and they have a direct impact on the way students choose to process tasks. Presage factors are one of three types of factors in learning theory: the other two are “process factors,” which involve which approaches to learning and teaching are followed, where activities take place, how assessment takes place, and whether IPE is optional; and the “product factor,” which is the collaborative outcome. In 1993, Briggs developed a conceptual model of learning and teaching called the 3-P model (referring to presage, process, and product) based on systems theory (Figure 1); the model was modified by Reeves and Freeth for use in analyzing IPE and putting IPE into practice. Reeves and Freeth found that the 3-P framework was able to capture the key features of dynamic systems and, in particular, show new insights, making connections clearer and highlighting the critical importance of presage. The aim of this study was to use the 3-P model of student learning to explore how dental students in an experiential IPE program in New Zealand made sense of engaging in an unfamiliar learning environment.

**Methods**

Ethical approval for the study was granted by the University of Otago (D13/019) including approval for group interviews with students, staff, and other stakeholders. A mixed-methods, multifaceted, external evaluation of the establishment and inaugural period of the IPE program was undertaken to examine the acceptability, effectiveness, and sustainability of the program. Data from health professions students in group interviews were analyzed to better understand how each profession negotiated the change from a predominantly uniprofessional learning experience to an interprofessional experience. Data relating to this question came from 16 focus group interviews conducted with all cohorts of students over a three-year period (2012-14; Table 1). A total of 24 dental students participated in the focus groups.

An interview guide (Table 2) was used during each focus group with a final open-ended question to allow students to elaborate on other aspects of interest. The focus groups were facilitated and audio-recorded by one of the authors (PG). The data were transcribed, so that the anonymity of each participant
was maintained. However, in many instances it was possible when reading the transcripts to gain cues as to each student’s discipline. Since the aim of this study was to explore dental students’ engagement in IPE, we decided to include only transcripts from blocks in which dental students took part. The Find function of Microsoft Word using the abbreviated search term “dent” identified comments relating to dentistry and dental students.

A systematic approach to the analysis was undertaken whereby selected transcripts from sequential cohorts were independently analyzed by one of four investigators (LFP, LG, PG, EM) using constant comparison analysis and taking an inductive approach to the initial coding (Figure 2). Once each of these investigators had gone through his or her own transcripts, they reviewed each other’s coding and agreed-upon categories. Key themes were then developed and re-reviewed by one investigator who was experienced in this form of qualitative analysis. This process enabled the key themes to emerge from the multiple focus groups and then allowed us to determine if the themes that emerged from one group also did so from other groups. Comments included for illustrative purposes reflect those comments most commonly coded in each category. In the analysis, we took particular note of the time periods in which the focus groups were held as it quickly became apparent that the negative tenor of comments and initially expressed discontent decreased over time, and the

Table 1. Number of students from each health profession who took part in the focus groups, by year and total

<table>
<thead>
<tr>
<th>Health Profession</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dentistry</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>Medicine</td>
<td>5</td>
<td>13</td>
<td>15</td>
<td>33</td>
</tr>
<tr>
<td>Nursing</td>
<td>6</td>
<td>10</td>
<td>15</td>
<td>31</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>4</td>
<td>9</td>
<td>11</td>
<td>24</td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td>Dietetics</td>
<td>0</td>
<td>10</td>
<td>9</td>
<td>19</td>
</tr>
<tr>
<td>Occupational therapy</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>58</td>
<td>72</td>
<td>159</td>
</tr>
</tbody>
</table>
students came to consistently express different and more positive learning outcomes. Following the coding and categorization, we used the 3-P framework to synthesize and explain the data.

Results

Six categories were identified: “expectations and realizations,” “not practicing: trade-offs/losses,” “learning with, from, and about each other,” “becoming open to a different clinical experience,” “valuing dental students’ participation in IPE,” and “learning about what dentists do.” Examples of coding within these categories are shown in Table 3. From these categories, three main themes emerged: “becoming a dentist,” “negotiating IPE experience,” and “valuing dentistry.”

Becoming a Dentist

Expectations and realizations. Dental students place a high value on the acquisition and practicing of dental procedural skills in becoming a dentist. The TIPE learning objectives were broader and included interprofessional collaborative teamwork, long-term conditions management, rural health, and Hauora Māori (an indigenous concept of health and well-being). The dental students’ initial expectations about the typical amount and degree of clinical dental practice were not met in the TIPE program. The dental students realized this early on and informally notified other dental students that they should not take part in the program. A student in Group 2 commented, “Personally I expected more clinical experience. But I heard from the previous students that we’re not going to have lots of clinical time at all.”

In the IPE program, the dental students frequently worked with children and with dental therapists within their scope of practice, not with adults and dentists. The students saw this as an area of practice that has perceived lesser status, offers a reduced scope for them as dental students to practice in, and would not normally form part of their work.

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Figure 2. Constant comparative analysis of focus group data

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as graduates. “When we spend [time] with dental therapists, we are limited,” commented a student in Group 6, “so in that sense it feels like we are going back to Year Two dentistry work.” Similarly, a student in Group 4 stated, “Others . . . are doing . . . complex things, and we are kind of like looking around in little children’s teeth.”

**Not practicing: trade-offs/losses.** The perceived lack of meaningful and skilled hands-on dental work worried some of the dental students. The early cohorts frequently compared their TIPE experience with what they imagined their peers were undertaking back at dental school or in other community-based settings. They felt as if they were missing out, were disadvantaged, and were losing out due to the perceived level of complexity in care their colleagues may be experiencing. A Group 2 dental student commented, “So I had 15 hours of chair time [clinical hands-on work] every week that was taken away for me to come to the [TIPE] program. . . . I was disadvantaged.” Another student in Group 2 agreed: “I felt as a final year student I wanted to . . . have more of a dental experience . . . but I had almost no dental experience [in the TIPE program].”

**Negotiating IPE Experience**

From the start of the program in mid-2012 and throughout 2013, the dental students frequently felt cheated of clinical experience. However, in early and mid-2014, descriptions of their experiences changed as they negotiated perceptions of missing out on the acquisition of more complex procedural skills. They started to balance that with describing the other skills they were gaining and clearly articulated what they came to see as a valuable dental experience.

**Becoming open to a different clinical experience.** The change as students became more open to a different clinical experience occurred after 18 months of the program. In response to feedback highlighting

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**Table 3. Examples of quotations with categories and themes**

<table>
<thead>
<tr>
<th>Quotation</th>
<th>Category</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Personally I expected more clinical experience. I had higher expectations.</td>
<td>Expectations and realizations</td>
<td>Becoming a dentist</td>
</tr>
<tr>
<td>I expected to have more dental experience than what ended up happening.”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“I would say you’d get an experience you wouldn’t get anywhere else and it’s good for your practice later on, I think.”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“We don’t do really much of dentistry, but more of managing cultural differences and stuff.”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“I felt I was very disadvantaged compared to the rest of my class back in Dunedin.”</td>
<td>Not practicing: trade-offs/losses</td>
<td></td>
</tr>
<tr>
<td>“I’m just standing there watching him doing the treatment, especially when it’s the whole day.”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“The stuff that we do here, we weren’t able to do at the dental school because [here] they are more acute.”</td>
<td>Becoming open to a different clinical experience</td>
<td>Negotiating IPE experience</td>
</tr>
<tr>
<td>“It was very useful for us: the cases you do not see at dental school.”</td>
<td>Learning with, from, and about each other</td>
<td></td>
</tr>
<tr>
<td>“You may never ever get this experience again, like working with Māori in a predominantly Māori community. So suck it up, and take from it all the best things that you can. Learn from it, develop it, and push forward.”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“I’m going to think that everyone in dentistry should come on an IPE because to actually get a really bigger picture would be better.”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“The most I learned about another profession was when I spent time with the dentist, actually in the clinical scenario.”</td>
<td>Valuing dental student participation in IPE</td>
<td>Valuing dentistry</td>
</tr>
<tr>
<td>“I didn’t get a dental placement, with a dental student, so I didn’t [like] that.”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“I had no idea what dentists do, and they taught me a lot about the chronic conditions of dentistry.”</td>
<td>Learning about what dentists do</td>
<td></td>
</tr>
</tbody>
</table>
dental students’ difficulties with the IPE program, the Faculty of Dentistry proactively began preparing the students who would participate in the following cohorts. This change resulted in an improvement in the students’ knowledge and groundwork for the program and meant that they were better prepared, could set more realistic expectations for the extent of clinical experience, and understood the trade-offs needed to develop collaborative skills. They felt reassured that they were not missing out, and this change allowed students to be more open to a different clinical experience. They were now able to look forward to learning distinctive skills they would not gain at dental school and value them as useful for future practice. A Group 8 student noted, “I would say that the IPE side of things of the program is really important as a lifetime experience.” “Obviously, there is a trade-off that there will be less practical time with your specific disciplines,” stated a student in Group 7, while one in Group 4 noted that “IPE was really good. I enjoyed it [laughs]. Everyone’s really awesome, and it’s great to learn more that each other does.”

Learning with, from, and about each other. In 2014, the dental students started to develop a clearer understanding of the value of the residential aspects of living and working with other health professionals. They became more aware of the constraints of the traditional educational programs and the lack of interprofessional learning in them. They started to realize that the structure of their dental education had the potential to leave them professionally isolated, which was not regarded as a positive outcome. “Everyone in dentistry should come on an IPE program,” affirmed a student in Group 9. “I think we should actually learn more in our dentistry school about the multidisciplinary team because we just get taught dentistry.”

Valuing Dentistry

Valuing dental students’ participation in IPE. From the outset of the TIPE program, non-dental students recognized the value of having dental students in the class and also the opportunity to have personal experience in dental clinics or with dentists. The affirmation of both these aspects of the program was not as readily replicated in comments about other disciplines. On one or two occasions when dental students were not in an IPE cohort, dental clinical experience was not offered to the remaining students, and the IPE students noted this as a negative aspect. A non-dental student in Group 3 commented, “it was really good having you [referring to a dental student in the group discussion] because we could subsequently ask a whole lot of dental questions because it’s [dentistry] . . . really important when you’re considering someone’s health, but something that we get taught absolutely zero about.”

Learning about what dentists do. Students from other health professions told the dental students that they were not fully aware of what dentists do and the breadth of undergraduate training needed to become a dentist. “I think at first glance that some dental procedures look almost alien . . . like why is this happening?,” noted one Group 3 non-dental student. The alien nature of dental work to an outsider was commented on by another non-dental student in Group 3: “And so to someone who has never seen it before, it can be quite puzzling as to why [name of dentists] are doing this and that.”

Discussion

A previous study of an IPE program examined participants’ satisfaction, modification of attitudes, and perceptions of IPE. Another study reported a positive experience for participants, with improvements in their ability to collaborate with members of other health care professions. In our study, the dental students who initially participated in the TIPE did not find it a positive experience. Very early on, in comparison with the other health professions students in the program, dental students stridently voiced their concerns. To better understand the complex factors that inhibited dental students’ initial enthusiasm for the IPE initiative, we used the 3-P model of learning and teaching. Our study found that presage, process, and product factors were closely and dynamically tied to the development of the program, with the themes identified mainly relating to the first P (presage) and in particular to learner characteristics.

A systematic review of IPE programs highlighted the importance of presage to the learner, in particular the learner’s expectations and beliefs. Presage factors exist before the learning experience and influence its creation, conduct, and learning outcomes. A major theme that emerged from the dental students in our study was the importance to them of clinical practice and their desire to be practicing clinical skills. They compared their experience unfavorably to their class peers, who they perceived were experiencing more clinical practice than students in the IPE program. That the dental students held this
belief and gave high value to the acquisition of procedural skills in becoming a dentist (above all aspects of IPE) became an important outcome that required careful consideration by the Faculty of Dentistry. Student enthusiasm (or lack thereof) has been found in other IPE programs and can be identified as an important presage factor. In our study, the initial dental students’ negativity towards IPE was reported to their peers in the current and subsequent cohorts. These concerns continued to be expressed in focus group comments.

Stereotyping and negative views of other professional roles were reported in a study involving multiple health professions, but we have also seen these attitudes expressed by dental students regarding other oral health professionals such as dental therapists and oral/dental hygienists. Dental students tend to have a strong sense of professional identity and professional hierarchy and may view dental therapists as supporting their profession rather than having independent, valuable, and complementary skills. These hierarchical attitudes have been found to discourage collaboration. In our study, dental students stated that the scope of dental therapy, which primarily involves managing the oral health needs of children, was not relevant to the everyday practice of a dentist. It is important to note that this perspective may be specific to New Zealand, where dental therapists have provided oral health care for children since 1921. The dental students in our study were aware that early dental care is critical to development of the adult dentition; however, they did not perceive children’s oral health as relevant to becoming a dentist in New Zealand. The students’ beliefs and prior learning (learner characteristics of presage) also influenced the overall quality of the products delivered by this initiative.

The characteristics of teachers and the quality of supervision are considered a key aspect for a positive outcome for IPE. The teacher characteristics are also identified as an important aspect of presage. In the TIPE program, clinicians specific to each discipline were employed as clinical facilitators. The dental students in our focus groups did not voice concern about their facilitator, who was an experienced private dental practitioner.

Although the Faculty of Dentistry proactively addressed the poor early evaluations and associated negativity by dental students by increasing communication with them, the program itself remained the same. That the IPE program was optional for students when choosing their community placement was also important because a previous study found that a lack of choice can impact process and successful program outcome. Staff members emphasized that the TIPE placement should be regarded primarily as an opportunity to work with other trainee health professionals in a rural Māori community and that there was ample opportunity to undertake complex restorative procedures in the remainder of the academic year. The importance of having a champion and facilitator of TIPE in the Faculty of Dentistry supports previous studies’ finding that an IPE champion is a strong enabler of IPE. As the role of the Faculty of Dentistry and the institution in explicitly preparing students for and supporting the IPE program increased over the three years, there was a distinct change in the students’ ability to negotiate IPE. This improvement highlighted the importance of faculty planning in implementing IPE and its impact in the planning (learning and teaching context) aspect of presage.

Dentistry has long been perceived as a profession in isolation, and there is a need to create and foster integration with other disciplines. The theme of “valuing dentistry” was reinforced by non-dental students who clearly articulated in our focus groups that they wanted to see what dentists did and to learn about dentistry. The other students became unhappy if dental students or dental clinical experiences were not included in their TIPE experience. They commented that dentistry and how it is practiced were “alien” to them. This finding reinforced that although dentistry is located in a division with other health professions at the University of Otago, the learning and practice of dentistry are isolated from those other disciplines. This theme focused on the contribution to IPE from dentistry and the positive influence it had on the overall learning process and product for the other health professions students.

It was clear that initially the product or collaborative outcomes of the program were less than ideal for the dental students. Having explored the interviews and gained an understanding of how highly these students valued the clinical acquisition of skills, we found it clear why they struggled initially with engaging in IPE. Dental students enter dental school to train to be competent practitioners, to learn to practice within their scope, and, at least in New Zealand, to prepare themselves to treat predominantly adult patients in private practice. The structure of undergraduate dental education in this country, informal feedback from students in their senior year, and expectations of the general public reinforce this model of dental practice.
initial negative feedback that was received allowed faculty members to reflect on these concerns and to emphasize to students a broader perspective of contemporary dental education. The dental students then appeared to understand the trade-off and accept that they would not be practicing procedures every day. They became open to other clinical experiences the IPE program offered including observing other health professionals, working with non-dental students, and taking part in broader community-based experiences.

The main strength of this study was the inclusion of data from 16 focus groups over a three-year period, comprising data from 159 health professions students including 24 dental students. This large number of subjects for focus groups allowed us to develop a comprehensive description of the dental students’ experience from the students themselves and to determine views of dentistry and dental students from students in other disciplines. As a consequence, data convergence was strengthened. A further strength was that the analysis was undertaken by four investigators, of whom only two were dental educators and the other two from non-dental backgrounds. This mix of investigators countered any unconscious professional bias. Taken together, the coding by four investigators resulted in a high level of thematic agreement.

A limitation of this study, in common with other descriptive IPE studies, was the lack of a theoretical framework, particularly one accounting for dental education, although the 3-P model was used to explain influencing factors. Theoretical underpinnings are important since IPE draws on education, psychology, and sociology theories for its rationale and delivery. However, in the absence of interview questions focused specifically on the experience of the dental students, the themes emerged unforced from the data in a naturalistic manner. Another limitation is that the results of our study may not be generalizable since the context in which this particular IPE project was conducted is distinctive in that students lived and learned together for five weeks, were located in a rural environment, and were immersed in the cultural ethos of an indigenous population. In spite of these limitations, our findings from this innovative program have highlighted the importance of presage and the impact of planning to prepare faculty and students before engaging in innovative programs. The 3-P framework illuminated that extra preparation may be needed to prepare dental students for participation in IPE programs.

Conclusion

Our results suggest that the 3-P model may be useful as a framework to untangle the web of influences on dental students’ experiences of IPE and to emphasize the key importance of presage. Our study highlighted the importance that dental students place on becoming a dentist, how they start to negotiate IPE, and their value to IPE programs.

Acknowledgments

We wish to thank the staff, students, and patients who participated in the Tairawhiti Interprofessional Education Program.

REFERENCES