RESEARCH

Using Visual Thinking Strategies to Support Development of Pharmacy Student Competency in Person-Centered Care

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Objective. To evaluate the introduction of 10 Visual Thinking Strategies (VTS) sessions into year 2 of a Bachelor of Pharmacy (BPharm) program with the aim of assisting students in developing the skills and attitudes required for inclusive practice.

Methods. The evaluation used a cross-sectional study design. All members of the first two successive student cohorts to complete multiple VTS sessions completed a 38-item online reflective questionnaire exploring student perceptions of competency development, transference, and session acceptability. Students were asked for their consent to include their responses in a research study. Closed-question responses were analyzed to produce descriptive statistics. Free-text responses were categorized and quantified using an inductive approach and manifest content analysis.

Results. Fifty-six percent of the students (98 of 174) allowed their responses to be included in the study. Students generally believed the sessions had supported their development of person-centred communication, cultural competence, and critical thinking skills. The minimum level of agreement that improvement in an area occurred was 74.5%. Free-text responses revealed the perception of additional skill and attitude development. Sixty percent of participants had thought about the VTS questions or used what they had learned in the VTS sessions in other settings. Eighty-six percent of students agreed that content on VTS should remain in the BPharm curriculum.

Conclusion. Incorporating regular VTS sessions into the second year of a BPharm program was acceptable to students. Data suggest that inclusion of multiple VTS sessions is a valuable addition to the pharmacy curriculum, offering affective learning experiences which support development and transference of key skills and attitudes relating to the provision of inclusive person-centred care.

Keywords: Visual Thinking Strategies, patient-centred care, pharmacy education, affective learning, competencies, transfer of learning

INTRODUCTION

In New Zealand, as in other parts of the world, achieving health equity is a goal of many health and disability systems and organizations.[1-5] Consequently, pharmacy services should be provided in a person-centered and inclusive manner as every individual has the right to have their needs understood and receive health services in such a way that their wishes are taken into account and their values and beliefs are accommodated.[6,7] In health care, working inclusively has been defined as engaging authentically with people and working effectively in different types of relationships that may involve "ambiguity,

contradiction, uncertainty and paradox."[8] Demographically, New Zealand is considered to be both a bi-cultural and multicultural country.[9] As such, culturally safe practices are an important element of inclusive practice.[10] Culturally safe practices require health professionals to consider power dynamics and imbalances within therapeutic relationships, patients' rights, and self-reflecting on the potential impact of their own culture and biases on their interactions with others.[11-14] Relatedly, cultural competence in a global context can be grouped into broad domains, of an awareness of one's own cultural biases and background, knowledge of other cultures, and an ability to respectfully manage the dynamics of difference.[15-18] However, supporting undergraduate pharmacy students in their development of the skills and attitudes required to practice in such an inclusive manner can be challenging given curricular constraints. Our national registration

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competence standards[19] require that a sensitive, proactive approach to teaching be taken,[20] with a focus on the affective domain of learning.[21,22]

Visual thinking strategies is a pedagogical method that was developed outside of health care, originally designed by Abigail Housen and Philip Yenawine to create inclusive discussions that foster person-centered competency development. It uses small group teaching sessions to explore and make sense of creative works using a structured facilitation method.[23,24] Pedagogy that uses VTS is constructivist[25] and aligns with Bruner's view of problem-solving stages in that it involves exploration, extraction of relevant information, simplification, and organization of information.[26] Originally designed to assist children with developing visual literacy and other transferable skills, VTS has increasingly been used in health professional curricula, often as an elective option, for a variety of purposes, including improving both observation skills and tolerance for ambiguity development,[27] and for building listening, analytical, and teamwork skills.[28]

In 2016, faculty at the University of Auckland piloted a project weaving VTS sessions throughout the entry year clinical and professional skills modules in the revised, integrated Bachelor of Pharmacy (BPharm) curriculum. These modules enabled students to develop knowledge and skills needed for competent pharmacy practice and included aspects of professionalism, clinical communication, and human behavior.

The VTS sessions were designed to support development of students' transferable competencies and attitudes relating to inclusive person-centered practices, including communication, cultural safety, critical thinking, and reflection. These aspects are important globally for inclusive practice as they facilitate relationship building and meeting the needs of diverse health consumers. However, somewhat absent from clinical education literature are practicable, low-cost classroom-based learning activities that can support development of such transferable competencies.

Our research aimed to address this gap by exploring three aspects of VTS implementation in our BPharm curriculum. First, we evaluated student perceptions of the effect of VTS sessions on their skills and attitude development relating to providing inclusive, person-centered care. Second, we examined the extent to which transfer of these skills to other settings, as reported by students, occurred since transfer of learning from academic to real-world settings is a challenging goal to realize.[29,30] Finally, this inquiry was important as curricula are "crowded spaces"[31] and, as such, we needed to ensure that students were accepting of VTS and that the method was providing the intended experiential development and transfer of competencies.

METHODS

During year 2 of the BPharm program, students participated in 10 VTS sessions with eight to 18 students per session over two semesters. The sessions were inserted into the final part of two-hour pharmacy practice tutorials, and covered topics such as communication and professionalism. The tutorials were streamlined to accommodate VTS. At the beginning and end of the year, students individually wrote about a creative work (the same visual image) using the required questions from the VTS methodology: "What's going on in this image?" "What do I see that makes me say that?" and "What more can I find?"[24]

Each approximately 30-minute session involved small group oral discussions using the same questions, where between one and three images (usually two) were discussed. Sessions occurred in standard teaching spaces and used projected images chosen to engage students and explore aspects of inclusion. Adhering to the VTS method, presented images became deliberately more ambiguous, and therefore challenging to interpret, as the year progressed. To maintain engagement, part way through the series, students could choose from several images presented to them. Following Housen's image selection method, we began the first VTS session with a less complex image, *July 7* (a painting by Frederick D. Jones, 1958),[32] moved to a more abstract image with image 2, *Roots* (a painting by Frida Kahlo, 1943),[33] and finished with an even more ambiguous image that we believed had the greatest potential for multiple interpretations, image 3, *Daughter* (a painting by Gregory Crewdson, 2002)[34] (Images of the artworks can be accessed through Google.com image searches.)

To encourage transference of VTS ideas and skills, the writing was purposefully linked to a four-part 2,500 word assignment. This incorporated: pre/post VTS writing sessions, quality and interpretation comparisons of the two pieces of writing relating to the image, anonymous peer-review using a web-based tool (each post submission reviewed by two peers), reflections on their learning through the VTS sessions, and the potential impact of VTS on their future pharmacy practice. Images were also linked to other course activities relating to culture and communication.

Study Design

The evaluation used a cross-sectional study design. In November 2017, all members of two successive cohorts of students completing the VTS sessions were asked to complete a 38-item online reflective questionnaire. Completion of the questionnaire addressed some of the course professional learning outcomes and the study aims.

The two VTS facilitators who were also research team members developed the questionnaire. The questionnaire, which was administered through Qualtrics, used Likert-scale, binary fixed choice items and explanatory, free-text responses. The questionnaire collected high-level demographic data, self-assessed skills development, self-reported transference of skills, and student views on the acceptability and value of the sessions. Completing the questionnaire was compulsory as it was considered part of the reflective learning component of the program. However, students were allowed to decide whether their responses would be included in the research project.

The study exclusion criterion was any student who had not participated in a year of VTS sessions and/or had not agreed to participate in the study. To preserve student confidentiality the data were downloaded into a spreadsheet by a non-pharmacy research team member. That team member separated out and de-identified the responses of those students agreeing to participate in the study, prior to TA and LP being given access to the data. All research participants were entered into a prize draw to win one of two $50 cafe vouchers, which were paid for out of the school's teaching fund.

Closed-question responses were analyzed in Excel. Open-text responses were categorized and quantified using an inductive approach and manifest content analysis.[35,36] Open text responses were categorized separately before comparing and agreeing upon the final categories and themes. Exemplar quotes from the explanatory open-text responses were used to enrich and illustrate the quantitative findings.

This research was approved by the University of Auckland Human Participants Ethics Committee. A short article relating to collaborative skills development arising from this study was published in 2020.[37] This paper reports on findings related to inclusive practice.

RESULTS

All 174 students who had completed their second BPharm year in 2016 and 2017 were invited to participate. Ninety-eight (56%) students consented to their responses being included in this study (25/76 from cohort one; 73/98 from cohort two).

Seventy-four students (75.5%) reported mainly listening in the VTS sessions, 52 (53.1%) spoke in most, or all sessions, and 35 (35.7%) added to the ideas of others in most, or all sessions. Additional details regarding respondents' characteristics and actions during the VTS sessions are provided in Table 1.

Table 1. Bachelor of Pharmacy Students' Characteristics and Their Behaviors During Visual Thinking Strategy Sessions Intended to Develop Competency in Person-Centered Care (N=98)

Respondent Characteristic or Behavior, No. (%)	
Characteristic	
Gender	
Female	63 (64.3)
Male	31 (31.6)
Diverse	1 (1.0)
Prefer not to say	3 (3.1)
Number of years in BPharm program when survey completed	
One	73 (74.5)
Two	25 (25.5)
Already completed a degree	
Yes	14 (14.3)
No	84 (85.7)
Have a prior interest in art (n=97)	
Yes	56 (57.7)
Neutral	18 (18.6)
No	23 (23.7)
Consider myself knowledgeable about art (n=97)	
Yes	21 (21.6)
Neutral	25 (25.8)
No	51 (52.6)
Behavior	
Mostly listened in the VTS sessions	
Strongly disagree	3 (3.1)
Disagree	7 (7.1)
Neutral	14 (14.3)
Agree	38 (38.8)
Strongly agree	36 (36.7)
Spoke in the VTS sessions	
Never	2 (2.0)
Sometimes	25 (25.5)
About half of the time	19 (19.4)
Most of the time	38 (38.8)
Always	14 (14.3)
Actively added to the ideas of others in the VTS sessions	
Never	1 (1.0)
Sometimes	35 (35.7)
About half of the time	23 (23.5)
Most of the time	27 (27.6)
Always	12 (12.2)

With respect to inclusive practice skills development, students were asked whether they believed that attending VTS sessions had improved specific components of their communication, cultural competence, and critical thinking skills. Participants overwhelmingly agreed that they had, with the lowest level of agreement reported for an item being 74.5%. The frequency distribution of student responses to six questions is provided in Table 2 along with an overview of student-perceived development of skills, competencies, and abilities as a result of participation in VTS sessions.

Additional professional skills believed to have been developed or improved through participation in the VTS sessions were explored through an open-text question. Responses were thematically analyzed and subsequently categorized into four broad skill-based themes of person-centered communication, cultural safety, habits of mind, and personal and professional. Illustrative student quotes related to those themes are presented in Appendix 1. With respect to learning transference, 59 (60.2%) students had thought about the VTS questions or used what they had learned in VTS sessions in settings outside of their BPharm clinical and professional skills classes. Open-text responses describing where this knowledge had been applied were categorized into 13 settings, the most frequent being everyday life (n=15) (Table 3). Forty-four (44.9%) students gave examples of where they had thought about the VTS skills or key questions during their placements or in other professional pharmacy practice settings, such as part-time pharmacy jobs.

Students were asked for their views on whether VTS sessions should remain part of the BPharm program. Eighty-four students agreed that they should, nine were neutral, and five disagreed. Themes arising from the reasons provided were developing communication skills, including the confidence to communicate, open-mindedness, critical thinking, and self-reflection. The themes with illustrative quotes are presented in Appendix 2. Additionally, some respondents cited the open and accepting environment of the sessions; others wanted the sessions to remain as they were, ie, fun, enjoyable, and/or interesting, and some described students' change in attitude towards the sessions as the year progressed. Eleven respondents believed there were too many VTS sessions in the year, 81 thought that 10 sessions were "about right," and six students thought there were too few sessions.

DISCUSSION

We adapted the visual thinking strategy methodology for use with pharmacist trainees and the pharmacy contexts of New Zealand, and to align with the Competence Standards for the Pharmacy Profession in New Zealand.[19] This study explored student perceptions of their skills development relating to person-centered care as a result of participation in a series of VTS activities, the transfer of this learning to other settings, and student views on VTS and participating in the sessions. This study was framed around students' self-evaluation of their VTS work.

The results indicate Visual Thinking Strategy sessions may make a valuable addition to our pharmacy curriculum, offering opportunities for students to integrate learning and transfer skills, knowledge, and attitudes both horizontally and vertically across the curriculum and into settings beyond academia. Student perceptions of the effect of VTS session participation on their skills and attitude development were positive. Students generally believed the sessions supported the development of all the skills and abilities surveyed, reporting a minimum level of agreement with improvement occurring of 74.5%.

Table 2. The Perceived Effect of Participation in Visual Thinking Strategy Sessions on Bachelor of Pharmacy Students' Skills, Competency, and Attitude Development (N=98)

My skill/competence/ability in/to _____ improved through attending the series of VTS sessions	Participant response, No. (%)				
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Active listening	40 (40.8)	41 (41.8)	13 (13.3)	4 (4.1)	0 (0)
Concise oral summary	26 (26.5)	64 (65.3)	6 (6.1)	2 (2.0)	0 (0)
Critical thinking	40 (40.8)	47 (48)	9 (9.2)	2 (2.0)	0 (0)
Cultural competencies	31 (31.6)	42 (42.9)	21 (21.4)	3 (3.1)	1 (1.0)
Meet the needs of diverse health consumers	30 (30.6)	44 (44.9)	20 (20.4)	3 (3.1)	1 (1.0)
Consider different ideas and contrary opinions with a more open attitude	64 (65.3)	28 (28.6)	5 (5.1)	1 (1.0)	0 (0)

Abbreviations: VTS=visual thinking strategy.

[a] The 59 students who participated in the study collectively named 63 settings.

[b] Responses add up to more than 100% as respondents could choose more than one setting and because of rounding.

Table 3. Settings in Which Transfer of Learning From Visual Thinking Strategies Sessions Occurred as Reported by Pharmacy Students (N=59)[a,b]

Setting	No. (%)
Everyday life	15 (25.4)
Pharmacy placements	9 (15.3)
Other university workshops, lectures and/or assignments	6 (10.2)
With family/at home	6 (10.2)
Pharmacy job	5 (8.5)
With people	5 (8.5)
With peers/friends	4 (6.8)
During retail work/part-time job	3 (5.1)
Teamwork settings/during group activities	3 (5.1)
Art galleries or when viewing art	2 (3.4)
General health care settings	2 (3.4)
When watching the news, advertising, or reading articles	2 (3.4)
During recreation time when playing strategy games	1 (1.7)

[a] The 59 students who participated in the study collectively named 63 settings.
[b] Responses add up to more than 100% as respondents could choose more than one setting and because of rounding.

Three areas were rated particularly strongly with respect to students' ability to consider different ideas (65.3% strongly agreed), development of critical thinking skills (40.8% strongly agreed), and development of active-listening skills (40.8% strongly agreed).

Advancement of these competencies through VTS has also been reported by others using student self-reports.[28,38,39] A 2019 narrative review concluded that, apart from clinical observation skills, evidence for visual image instruction in developing other skills during medical education is poor.[40] However, unlike these other single-session interventions, our findings arise from participation in multiple VTS sessions and related activities across an entire academic year. This was deliberate, as Housen's original VTS studies revealed that repeated sessions were optimal for embedding skills and realizing transference of learning to other situations.[23,41] With minimal space available in the curriculum, a series of VTS sessions was incorporated within existing year 2 foundational skills teaching sessions. Naghshineh and colleagues noted a skill-building VTS session "dose" effect with medical students[42]; Poirier and colleagues reported that participation in a series of 15-minute VTS sessions resulted in pharmacy students making more observations about images.[43]

A focus on skills and attitudes developed in these sessions could be considered as fostering the "habits of mind" that Costa and Kallick note should be "performed automatically, spontaneously, and without prompting."[44] Achieving this requires regular practice. The beneficial effect of participating in numerous sessions was noted by some of our students who recognized their own initial resistance to the sessions and later their transformed views and attitudes and skills development over time.

A recent review by Mukunda recommends that visual image evaluations should incorporate more rigour.[40] Although not presented as data in this study (due to ethical constraints), respondents' perceptions of their skills growth over the year as a result of applying VTS were consistent with the changes reflected in the students' written assignments, which were assessed using a validated VTS assessment rubric. The rubric examines elements such as students' observations, interpretations, evidence provision, and revised opinions.

Having pharmacy students participate in VTS sessions appeared to address the affective domain of learning, which is recognized globally for its importance in helping students manage the emotional contexts and dissonance of interacting with people with diverse views and experiences.[22] Similarly, Frei and colleagues used art observation and interpretation with nursing students to develop nuanced understanding of communication, power in relationships, and empathy.[45]

Additionally, VTS allows the facilitator to model inclusive practices and for participants to experience being listened to, having their views validated, and being asked to justify their viewpoint in an open and non-judgmental manner.[39] The consistent process acknowledges different interpretations and encourages students to gain confidence to express their ideas and to actively and respectfully disagree with others.[46]

Another strength of the VTS method is the flexibility afforded by image selection. We deliberately selected images that would challenge students and tap into the affective domain of learning to align with our own curricular goals and context. However, image selection can be used as a means to focus student learning on other desired learning domains and goals.[28]

We assert the retention, habitual use, and transference of the skills and attitudes developed by pharmacy students in this study through VTS learning is crucial for the development of inclusive health practitioners. Our findings suggest that pharmacy students' VTS-acquired learning can be and was transferred to other settings. We believe that modelling being reflective practitioners and the habitual use of the VTS three-question facilitation structure aided pharmacy students in their ability to transfer VTS skills and attitudes to other settings. Students participating in this study agreed that their VTS learning had been used in

other areas both in pharmacy and non-pharmacy settings. VTS has been described as a model of engaged discussion where participation is expected.[46] To increase learning transference, Caffarella highlights the significance of active learning techniques that include application of knowledge and critical reflection opportunities embedded within this new learning.[47] In addition to the active learning that occurs during VTS sessions, transfer of VTS learning was also encouraged through the four-part VTS assignment that required students to reflect on and document the writing of others about an image, changes in their own interpretations of an image, and where their developing skills would be useful in future pharmacy practice. Completing the questionnaire served as a reflection point, hence it was mandatory.

Purposeful reflection is a tool for gaining self-knowledge and insight.[48] Mezirow's assertion that critical self-reflection can lead to transformational learning[49] supports our own observations and the central role of self-reflection in professional development is further documented elsewhere in clinical education literature.[12-14,22,29,50]

The pharmacy students in this study were overwhelmingly positive regarding the acceptability of participating in the series of art-based VTS sessions, with 86% believing that it should remain in the curriculum despite almost a quarter of study participants indicating no prior interest in art and half self-reporting no art knowledge. While some students appreciated the skills-building aspect of the sessions, other student responses to the assignment included enjoyment, interest, and a break from a "science-only" focus that the sessions provided. Poirier has likewise reported pharmacy student enjoyment of VTS sessions.[43]

One limitation of this study is that the findings were based on students' self-reported perceptions of VTS sessions. Additionally, for ethical reasons no control group was used. Data were gathered soon after the completion of the session series for some participants and 12 months post-completion for others. While this resulted in a lower response rate, collecting data 12 months post participation may have given students time for VTS skills to be applied and the significance or insignificance of VTS to be recognized. The response rate was 56%; therefore, responder bias, with or without social desirability bias, could have occurred such that only students with favorable views consented to participate in the study, despite survey responses being de-identified prior to analysis. Also, students may have misattributed their skills growth to VTS when it arose from increasing maturity, other teaching activities, and/or experiences, or that their skills growth resulting from VTS participation was unrecognized.

CONCLUSION

This study adds to the body of literature examining practical methods to develop person-centered practices and transferable competencies in pharmacy students through structuring of divergent, discussion-based, reflective activities in class. Incorporating multiple VTS sessions into year 2 of the BPharm program appears to have been a valuable addition to the curriculum. The sessions are acceptable to students and seem to support the development of key skills and attitudes relating to providing inclusive person-centered care. This incorporates critical thinking, professional skills, and aspects involving the affective domain including communication, cultural safety and self-reflection. Visual thinking strategies also offers opportunities for students to integrate learning from other areas of the curriculum, and students report transference of attitudes and skills to other areas of the curriculum, practice, and their personal lives. Future research will aim to provide further evidence that development of person-centered skills and attitudes can be supported through judicious image selection and priming of students by articulating the overall purpose of VTS in the curriculum and the focus of each session.

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Appendix 1. Themes and Illustrative Participant Quotes Relating to Additional Professional Skills Students Perceived They Gained Through Participation in Visual Thinking Strategy (VTS) Sessions

Theme	Participant Quotes
Person-centered Communication	"Helped to improve skills in conveying empathy" (P9 Year 2)
	"Appreciating different perspectives/ideas, and then integrating them into a narrative/summary; eg, collaborating with a patient to develop a care plan." (P17 Year 2)
	"Understanding the patient's perspective, but also observing them more holistically. Additionally to not make assumptions about people." (P67 Year 3)
Cultural Safety	"I have better insight into how the patient's background might affect their beliefs around medication." (P2 Year 2)
	"Being able to take into account the perspective and opinions of others, and to not just make decisions and conclusions based on my own understanding." (P8 Year 3)
	"Being able to interpret a situation in different ways and looking at it from other people's perspective" (P63 Year 3)
Habits of Mind	"Taking time to consider a situation in all aspects before acting. Looking for more in a situation even when you think you have covered all aspects." (P23 Year 3)
	"Understanding the 'why' part behind things, and not just coming to a conclusion based on what is placed right in front of me." (P48 Year 2)
	"To accept ambiguity and the diversity of ideas" (P81 Year 2)
Personal and Professional	"Building on each other's ideas. I believe this will be an important skill in the future when negotiating with patients and other health professionals." (P27 Year 2)
	"Professionalism - I have developed the ability to explain things in a more formal and appropriate manner. Choosing the right words and focusing carefully on sentence structure, so as not to convey messages inappropriately is another skill I have developed over the past Learn To See sessions." (P28 Year 2)
	"The ability to resolve conflict, establishing and maintaining collaborative working relationships and the ability to make effective relationships." (P30 Year 2)

Appendix 2. Pharmacy Students' Views on Whether the Visual Thinking Strategies Intervention Should Remain in the Bachelor of Pharmacy Program and Reasons Given for Those Views (N=98)

Opinions expressed					
VTS should remain part of the BPharm program	Strongly disagree N (%)	Somewhat disagree N (%)	Neither agree nor disagree N (%)	Somewhat agree N (%)	Strongly agree N (%)
	2 (2)	3 (3)	9 (9.2)	39 (39.8)	45 (45.9)

Reasons	
Theme	Participant Quotes
Development of more open-minded attitudes to different perspectives and beliefs	"In the first semester I hated learn to see and thought that what people were saying was ridiculous. I now realise that everyone does have a valid point, and that there is a purpose in these exercises. Generally, I just really enjoy these sessions." (P88 Year 2)
	"It's a useful tool that helps students become more open-minded about other people's opinions and being able to confidently voice their own perspectives because of their ability to give evidence." (P97 Year 3)

(Continued)

Appendix 2. (*Continued*)

Reasons	
Development of critical thinking skills through facilitated group discussion	"Helps to ease into the profession and develop critical thinking skills through a fun and interactive process." (P38 Year 2) "They're great for making students think in unconventional ways and allowing them to express themselves, which is hard to do in a clinical program like pharmacy. It's a kind of interaction/discussion that we don't really get to experience, and I think that it is invaluable to our learning. It also facilitates the development of our critical thinking skills, which will form a major part of our practice as future pharmacists and they're really fun!" (P88 Year 2)
Development of communication skills and confidence to express own ideas	"Becoming more involved and participating in group discussions, which was something I did less of previously, due to the open environment." (P10 Year 2) "At first, I did not understand why we had to do them [VTS sessions] as I couldn't see how it related to the programme but over time, I saw my own communication skills develop and I think it's useful to be able to have someone relay back the information you've said as you're never sure if you've explained it clearly to someone." (P19 Year 2) "It is actually a very interesting programme and is very different from the lectures and workshops that we have. It encourages us to voice our opinions in a constructive manner." (P20 Year 2) "… learn to see sessions also encouraged me to speak up and be bold" (P96 Year 3)
Development of personal self-reflection skills	"You don't realise it helps until you reflect. It may seem pointless and weird at the beginning, but once you see the true purpose and realise how it has changed or improved or added to your skills repertoire then you will really start to enjoy the sessions." (P7 Year 2) "… these workshops were a first prompt for me to self-reflect at a university level and this has facilitated better self-reflection ever since." (P70 Year 3)