

ORIGINAL ARTICLE

Volume 15 Issue 3 2023

DOI: 10.21315/eimj2023.15.3.6

ARTICLE INFO

Received: 19-12-2022

Accepted: 22-02-2023

Online: 28-09-2023

Competence Behaviour Cultivation Among Physiotherapy Graduates with Programmatic Clinical Portfolio: A Behavioural Change Intervention

Bhavani Veasuvalingam¹, Muhamad Saiful Bahri Yusoff², Devinder Kaur Ajit Singh³

¹Centre of Education, International Medical University, Kuala Lumpur, MALAYSIA

²Department of Medical Education, School of Medical Sciences, Universiti Sains Malaysia, Kelantan, MALAYSIA

³Physiotherapy Program, Centre for Healthy Ageing and Wellness, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, Selangor, MALAYSIA

To cite this article: Veasuvalingam B, Yusoff MSB, Singh DKA. Competence behaviour cultivation among physiotherapy graduates with programmatic clinical portfolio: a behavioural change intervention. *Education in Medicine Journal*. 2023;15(3):71–86. <https://doi.org/10.21315/eimj2023.15.3.6>

To link to this article: <https://doi.org/10.21315/eimj2023.15.3.6>

ABSTRACT

Creating a competent healthcare workforce that can meet the demands of the 21st century's globalised healthcare system is a top priority. The purpose of this study was to understand how competency behaviours of final-year physical therapy students are promoted through an evidence-based Programmatic Clinical Portfolio (Pro-CP). If Pro-CP can develop competency behaviours, this study further explores the factors contributing to the development of competency behaviours. The Pro-CP instrument was developed based on contemporary principles of the programmatic assessment model, which provides a valid measure of workplace competence. A phenomenological study design was used to capture the experiences of final-year physical therapy graduates. The sample (n = 32) was drawn from both public and private settings during a four-week clinical internship. Data from the focus group discussions (FGDs) were coded deductively using the Theory of Planned Behaviour (TPB) to assist in answering the research questions. Five themes emerged from the thematic analysis, namely, (a) Increased behaviours towards Pro-CP; (b) Decreasing subjective norms towards Pro-CP; (c) Increased self-efficacy towards Pro-CP; (d) Increased learning autonomy towards Pro-CP; (e) Need for institutional support. This qualitative study highlights the key elements of behavioural beliefs, normative beliefs, and perceived behavioural control concerning self-efficacy to understand the cultivation of competence behaviours. Consideration of programmatic assessment principles in the design of the competence assessment instrument holds promise for providing a valid value that genuinely defines the competency behaviours of physical therapy graduates. This study adds new thinking to competence assessment instrument in physical therapy.

Keywords: *Clinical competence, Programmatic clinical portfolio, Physiotherapy, Behavioural change, Theory of planned behaviour*

CORRESPONDING AUTHOR

Bhavani Veasuvalingam, Centre of Education (ICE), International Medical University, No. 1, Persiaran Jalil 1, Bandar Bukit Jalil, 57000, Kuala Lumpur, Malaysia

Email: Bhavani@imu.edu.my

INTRODUCTION

The transition from physical therapy student to recent graduate is reportedly challenging, and the clinical internship is believed to be the key in developing independent clinicians (1). Physical therapy regulators continually advocate for adherence to competency standards (2), and a recent systematic review found that clinical performance assessment tools in physical therapy require more rigorous evaluation processes (3). The best evidence in medical education has highlighted the importance of rigorous testing of clinical performance assessment tools as it impacts graduate preparation for practice and compromises patients' safety (4). The modern view of medical and allied health programmes is to move from the traditional educational approach to competency-based medical education (CBME) (5–7). CBME is characterised by student-centeredness, active engagement, design flexibility, constructive alignment of learning activities with assessment, and spiral development of concepts, knowledge, and skills. CBME focuses on feedback to students and the use of criterion-referenced assessment to support decision-making regarding students' performance. Another important aspect of CBME is the training of assessors to ensure the reliability of the assessment tool. In the area of performance assessment, the portfolio is at the forefront of Miller's pyramid (8). While there is widespread agreement on the challenges of measuring the complex phenomenon of competence (9), the programmatic assessment model (10) with its six assessment principles, has been proposed. In the current study, a Programmatic Clinical Portfolio (Pro-CP) was developed based on Vleuten's six principles and aimed at effectively measuring competency behaviours.

The Theory of Planned Behaviour (TPB) (11) is well known for explaining intervention-induced behavioural changes. TPB states that human social behaviour is determined by three distinct beliefs: beliefs about the outcome of the behaviour and its evaluation, normative expectations of others, referred as normative beliefs, and beliefs regarding the factors that prevent the behaviour from being performed, known as control beliefs (12). Intentions are the most important predictors of behaviour (13) and are influenced by attitude towards the behaviour, subjective norm, and perceived behavioural control (PBC) (14). The greater the behavioural belief, subjective norms, and perceived behavioural control, the stronger the intention to perform the behaviour in question (15–18). Figure 1 summarises the TPB. The process and mechanism of how competency behaviours are cultivated based on an evidence-based clinical assessment tool remain to be explored. This study aims to understand how a Pro-CP can cultivate competency behaviours and, if it works, why it works that way, based on the TPB framework, to offer an explanation (11, 12, 14, 19, 20). It is hypothesised that the new findings from this study will contribute to the body of knowledge regarding the valid development of a clinical performance assessment instrument to measure competency behaviours in physical therapy graduates. The overall goal of this study is to understand the processes and mechanisms by which Pro-CP cultivates competency behaviour in physical therapy students. Specifically, to answer the question of how Pro-CP cultivates physical therapy students' competency behaviours in their final year of study and what factors contribute to the development of competency behaviours.

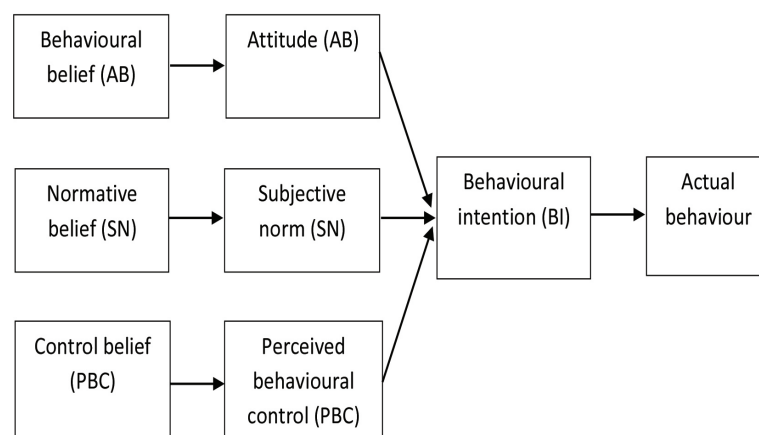


Figure 1: The diagram of TPB model.

METHODOLOGY

As the aim of this study is to explore the students' experience with Pro-CP, the reality of this knowledge is subjective and very much dependent on the individual student's perception of Pro-CP. Hence, ontologically and epistemologically, it fits with the methodology to seek individuals' views and explanations rather than general views, and qualitative approach is more likely to be employed. Assessing individuals' views to construct meaning is essential in qualitative research and as a qualitative researcher in this study, keeping neutral throughout the data collection and analysis process has been preserved at all times. The choice to conduct focus group discussion (FGD) as the data collection method was made to allow in-depth discussion on experiences and views over a range of participants on the given topics.

Methods

This phenomenological study design explored physiotherapy students' lived experiences with Pro-CP as a formative assessment tool. Two well-established, accredited schools of physiotherapy (public and private) that have been operating the Bachelor of Physiotherapy programme for more than five years were identified. Ethical approval was obtained from the ethics committee of the funding institution,

Universiti Sains Malaysia (USM), and the ethics committees of the two participating universities.

Purposive sampling was used (21) to recruit final-year graduates of the Bachelor of Physiotherapy (Hons) programme on a voluntary basis via email. Thirty-two students ($n = 32$; 24 from a public college and 8 from a private college) participated in the study after providing informed consent before the study began. Demographic data were collected from both cohorts. The inclusion criteria were all students in their final year of physiotherapy programme.

The Pro-CP instrument is a portfolio-based assessment designed in accordance with the six principles of the programmatic assessment model (10). Pro-CP consists of three workplace-based assessment tools (22): the mini-Clinical Evaluation Exercise (mini-CEX), direct observational procedural skills (DOPS), and a structured critical reflective writing based on a set of questions developed utilising key reflection principles (23). Table 1 provides the summary of the Pro-CP instrument items and its function. Pro-CP employed specific feedback principles (24, 25) and developed criteria-referenced assessment (CRA) rubrics to guide feedback at the conclusion of each patient encounter (26). Students and clinical instructors (CIs) received Pro-CP training with the intention of acquainting

Table 1: Pro-CP assessment instrument and its function

Pro-CP instrument items	Functions
Clinical Learning Outcome (CLO)	Guiding students in clinical learning
Mini-CEX form with feedback and Likert score	Students utilise for history taking
DOPS form with feedback and Likert score	Physical examination
Critical reflective writing with criterion referenced rubric with feedback and scoring rubric	A set of questions related to patient encounters to generate differential diagnosis
Criterion referenced rubric for end of placement scoring	Assist in scoring the clinical performance

them with the instrument. Following the training, Pro-CP was implemented in the respective hospital for four weeks of musculoskeletal clinical placement. As the behavioural criterion, the target behaviour was the successful completion of Pro-CP, which is a crucial consideration (27).

Data Collection

Three FGDs were held, with 8 to 12 students per group, and adequate sample size in each group is determined by “information power”, which guides adequate sample size in qualitative studies (22). The current study is expected to generate higher information power due to its narrow study aims, the targeted sample of final year physiotherapy students, and specific framework (TPB) serving to offer relations between aspects of empirical data as highlighted by Malterud and team. Each FGD session lasted an average of 90 minutes and was audiotaped with verbal consent obtained, and anonymity preserved all the time. Data confidentiality was maintained and declared as USM property.

A set of open-ended, semi-structured questions was developed using the TPB model. The four major TPB constructs—attitude towards the behaviour, subjective norm, and perceived behavioural control—were assessed. As a result, the defined target behaviour is the students’ intention to use the Pro-CP instrument to develop competence behaviour. Target behaviour by target, action, context, and time (TACT)

based on Jillian’s manual (23) was adhered to ensure validity.

All FGD data were transcribed verbatim and thematically analysed (24) with Atlas.ti version 7.0 software. Open coding was performed to generate subcategories, categories, subthemes, and themes (25). Concept-driven coding was applied with TPB to evaluate the intention to use Pro-CP, which promotes competence behaviour among the physiotherapy students. The researcher bracketed subjectivity throughout the analysis to secure the quality of the data.

Rigor

The researchers worked collaboratively throughout this research project. The semi-structured questions were developed based on a clear guide on the qualitative framework for collecting data in focus group research (26). This was discussed with the other two researchers for consensus and to mutually discuss any disagreement. The FGD sessions were conducted by the researcher, who is not part of the institution where the candidates are studying, hence the power relations have been totally eliminated. This allowed the candidates to engage with confidence and trust. This study adhered to a list of criteria advocated in a focus group guide while designing the sessions to ensure the credibility of the focus group session (27, 28). Strategies for trustworthiness in data collection and analysis are tabulated in Table 2.

Table 2: Trustworthiness steps in FGD data

Credibility	Strategies for trustworthiness
Member checking	The FGD data were checked on the spot by paraphrasing the data in-between discussion to clarify meaning and summarising the points of discussion and asking participants to verify the summary versions at the end of FGD verbally (3).
Triangulation	Environmental triangulation (4): four focus group data findings from four higher educational institutions both government and private (3), compared for similar results across locations revealing worthy data credibility. Methodological triangulation (4): FGD were compared to evident similar results to add validity to the results.
Researcher credibility	The moderator has undergone formal FGD workshop.
Bracketing researcher subjectivity	Reflexivity: The researcher assessed own biases and remained open without any preconceptions to prevent any bias effect in FGD.
Participants' honesty	All the study participants in focus group were given total voluntarism in their involvement with the freedom to withdraw from the study at any time clearly. This is to preserve the honesty in the data collected (3).
Peer debriefing	The researcher liaised with supervisor regarding the data analysis to ensure the appropriate methods is performed.
Transferability	A thick description of methodology: details of focus group setting, key informants, sampling method, size, data collection methods, number and length of the data collection sessions, time period over the data collected were detailed out to enable generalisability of the data (3). Refer to 3.2.4 and 3.2.4.1.
Dependability	Code recode procedure was conducted 3 times to compare the codes for accuracy. This strategy ensured consistency in the result generated in focus group data. The protocol used for FGD adhered to the guide provided by the literature (6) and (7). Refer to Appendix A3-1f, A3-1g, A3-1h, A3-1i and A3-1j of FGD protocol, ground rules and the semi-structured interview.
Confirmability	This research process is audited by the supervisor to ensure the path of theory construction and interpretation is accurate.

Table 3: The demographic profile of student participants

Institution	Sample size, n	Gender	Age
Public university	24	95.8% (F) 4.16% (M)	23
Private university	8	87.5% (F)	23.3

Notes: F = Female; M = Male.

RESULT

A total of 31 students (96.87%), with one dropout, participated in the study. Table 3 represents the participant's demographic profile.

Five themes emerged, offering an in-depth understanding of how competence behaviour was cultivated using Pro-CP and the factors contributing to its development. Table 4 shows the five themes from the focus group data analysis.

Table 4: Five themes from the focus group data analysis

Theme 1: Increased attitudinal behaviour towards Pro-CP	
Enhanced clinical skills	<p>“In my opinion DOPS help us to have a clearer picture of what is the sequence of the objective assessment, we won’t miss out any important assessment we should do, and it also helped us link the subjective assessment and what we should do in objective assessment.” (Student C, Group 1)</p> <p>“Pro-CP changed our performance in clinical currently because before we had Pro-CP, we do not really know the correct sequence, to do and how to connect things one another, or only focused on one patient problem but after Pro-CP we also focus on patient functional part like functional limitations.” (Student E, Group 2)</p> <p>“So, I think look at the tool, its useful for us, because mini-CEX and DOPS is very detailed, like the mini-CEX for subjective assessment, every step is detailed like, we know the pain ax, social history taking, we know where is our strength and limitation and we can improve accordingly, and also like Critical Reflective Reasoning Evaluation as Artifacts of Thoughtful Evidences (CREATE) we can think deeply and know the clinical reasoning, what is the problem, all those will help us to improve our skills and clinical reasoning.” (Student H, Group 1)</p> <p>“The DOPS I found quite useful because before this during the clinical posting we didn’t realise our positioning, our handling skill like PAIVMS or other handling skills for the patient is correct or not but now after the CIs give comments, regarding the small, small details of my handling skills, then I know which area should I improve more and DOPS also like help us in asking for consent before touching the patient, how we assess patient more objective skills, so I think it’s quite useful with DOPS.” (Student D, Group 3)</p>
Soft skills cultivation	<p>“From my opinion, I think Pro-CP not only help us in improving our practical skills, but also improve our interpersonal skills for example what is the effective communication and also train our professionalism in handling a patient, it’s like not only covering the practical skills but also soft skills.” (Student C, Group 3)</p>
Fostering higher order thinking	<p>“So, Pro-CP helped me to improve more on critical thinking, especially in order to find the main problem of the patient, so that I can create a good intervention for the patient also.” (Student D, Group 2)</p> <p>“I agree with D in term of critical thinking, Pro-CP cultivates critical thinking and reflective thinking because before Pro-CP we don’t have specific guideline that tells us what to reflect on, so with CREATE we have proper guidelines, how do we do reflective thinking and critical thinking on every case, so that we can improve for next similar case.” (Student C, Group 3)</p> <p>“I found it is quite useful, we can link patient complain in the subjective and what we ask more detail in the subjective to our objective, then does it tally with the objective assessment. Result that we found out, can facilitate our clinical reasoning regarding what structure, functional impairment, limitations patient, really have. So, we will prescribe more accurate treatment for the patient regarding the patient’s problem.” (Student D, Group 2)</p>
Sampling various cases	<p>“I think it would depend on what kind of cases we are getting when we are applying Pro-CP. If it’s going to be just a simple humerus fracture, if we happen to get 10 patients who are having humerus fracture, of course we will be well versed in it, but you won’t be seeing much improvement unless we use Pro-CP on variety of cases then we can see the difference where we are lacking.” (Student B, Group 2)</p>
Prior knowledge activation	<p>“The reflective writing part was helpful in refreshing our knowledge, so I like that part, because when we have Pro-CP, it will constantly refresh our theory.” (Student A, Group 3)</p>

(Continued on next page)

Table 4: (Continued)

Theme 1: Increased attitudinal behaviour towards Pro-CP	
Feasibility	<p>"I think the mini-CEX, and DOPS is easier to be conducted and to be done." (Student F, Group 2)</p> <p>"Using Pro-CP once a week or may be two weeks once is better but not for everyday use." (Student G, Group 3)</p>
Theme 2: Decreased subjective norms towards Pro-CP	
Student users	"It is definitely important to be competence because it makes you a better professional...so now we are fourth-year students and going into working area and it is important and something we really need." (Student B, Group 1)
Faculty users	"I think the decision to use Pro-CP will come from the faculty, so even if we student or therapist say yes or agree with Pro-CP, I don't think they would give much consideration." (Student H, Group 3).
ClIs users	"I think the ClIs support is important, if we have to use Pro-CP every day, or weekly basis that will be a lot for them to mark." (Student B, Group 2)
Theme 3: Increased self-efficacy towards Pro-CP	
Sensitivity in error detention	<p>"The main thing if we were given a single assessment form, we would not really focus on certain factor but the evaluation component in Pro-CP really brought out many things, which we didn't think like the lacking in certain area which was usually undetectable." (Student A, Group 1)</p> <p>"The good thing about mini-CEX, it helped us corrects the way we ask the questions, the soft skills, our body gestures and for example if I am speaking to the patient, I am not looking at the eye contact, so I know I need to improve more on the eye contact. So, I think that is the things that from the previous assessment approach is not very relevant to use. I think the items in mini-CEX, how they assess us in term of the soft skills, makes me more aware of." (Student F, Group 2)</p> <p>"Pro-CP is a good tool because the component inside, actually considers quite thorough, it covers most of the aspect we need to cover inside the subjective and objective." (Student B, Group1)</p>
Structured and personalised feedback	<p>"Personally, I feel that it cultivates the clinical competence among students personally because it is an assessment which is structured, the mini-CEX, CREATE and DOPS are very structured, and it is personalised for every student where we can get personal feedback from the ClIs." (Student D, Group 3)</p> <p>"ClIs able to assess students thoroughly, more specific on my subjective assessment, my objective assessment and how to analyse the information that I have got." (Student G, Group 2)</p> <p>"Our ClIs give comments accordingly and the ClIs also got a guideline like what to comments, what to teach us especially the CREATE part which challenges our critical thinking." (Student B, Group 2)</p>
Improved clinical teaching	<p>"I think it helped in a way, specifically when we went wrong, ClIs use that error to teach us how to perform properly, I think one of mine, was the positioning while taking range of motion was wrong, so the CI taught me how to do it properly and expected me to go and learn more about it and come back again and perform it properly, so this was a very good experience, because I get to see CI doing it and then how I should be doing it the next time, so." (Student H, Group 1)</p> <p>"What was really interesting was if some components were unmet, we sit and ask the CI, how can I improve the next time and they would give me suggestion and then I would go back and see how to improve on it so, this was like a whole improvement going on from one step to the other yeah." (Student D, Group 1)</p>

(Continued on next page)

Table 4: (Continued)

Theme 4: Increased learning autonomy towards Pro-CP	
Self-regulated outcomes and feedback	<p>“Because if we actually write down, we have the goals that we need to follow so that we know what we should learn and what we should practice more...also we can get better outcome. So SMART L. O is like our aims and guidelines.” (Student B, Group 2)</p> <p>“In order to achieve my first learning outcome, I need to try to work harder, and need to find some more theory information or practice of my skills to achieve that goal for the next assessment or treatment, that’s how it helps me to be active learner and keep continuing my study and my practice.” (Student E, Group 1)</p> <p>“Yes, it is good, the SMART Clinical Learning Outcome (CLO) and I think one correction cannot make us better and also, we tend to do same mistakes several times and Pro-CP is structured, or we have documented things to help us human who tend to forget.” (Student H, Group 3)</p>
Criterion referenced self-directed learning	<p>“The scoring was good, as it really worked in the sense that I had aspects which was unmet, so by second week second attempt with Pro-CP, the scoring was met, so I was able to compare and then see how I improved. So, I think it was a good factor.” (Student E, Group 3)</p> <p>“I think the score, it shows me like where I stand so if I get the lowest score, I will motivate myself to work harder to get a higher score for the next time, so yeah...I think the scores really helps to motivate me to get...ahh ...improve myself and do better in the next one.” (Student G, Group 1)</p>
Theme 5: Need for institutional support	
Training and manpower	<p>“I feel the training done helped us familiarise with Pro-CP but the gap between the training and the actual implementation was too long.” (Student A, Group 3)</p> <p>“I feel this definitely helps because our batch is big so basically, we are posted in three different posting area so, like in musculoskeletal we have minimum of eight people, so we have four weeks to finish both Pro-CP, so it is very rushing for the CIs to complete although they are willing to do due to lack of time, the time constraint is because they have only two CIs that helps us with this Pro-CP.” (Student I, Group 2)</p> <p>“I think because we lack manpower that is the main issues of the CIs. So, all of us are in final year already and we need to graduate and work, so we ourselves can observe our peers so, maybe they can suggest improvement.” (Student C, Group 2)</p>
Appropriate patient scheduling	<p>“I feel the training done helped us familiarise with Pro-CP but the gap between the training and the actual implementation was too long.” (Student A, Group 3)</p> <p>“I feel this definitely helps because our batch is big so basically, we are posted in three different posting area so, like in musculoskeletal we have minimum of eight people, so we have four weeks to finish both Pro-CP, so it is very rushing for the CIs to complete although they are willing to do due to lack of time, the time constraint is because they have only two CIs that helps us with this Pro-CP.” (Student I, Group 2)</p>

Theme 1: Increased Attitudinal Behaviour Towards Pro-CP; Category: Usefulness and Ease of Use

Pro-CP usefulness was highlighted from several perspectives from the student’s perspective, such as enhanced clinical skills, soft skill cultivation, higher-order thinking skills, sampling across multiple cases, prior

knowledge activation, and feasibility. DOPS, as one of the items in Pro-CP, in particular, claimed to provide a clear overview of physical examination procedures and was thought to guide students in conducting physical assessments. DOPS was perceived as an aid to the students in linking the subjective findings and preparing them for physical examinations. Overall, Pro-CP was

perceived to improve clinical performance to be more organised, enable meaningful connections and focus more on the patient's problem from a functional perspective. Pro-CP believes in promoting interpersonal skills relevant to practical skills and higher-order thinking skills, particularly critical thinking, to assist patients in problem-solving and devising effective treatment interventions. Pro-CP usefulness was also considered ideal across multiple cases for comprehensive learning. Pro-CP expressed a desire to activate students' prior knowledge, particularly through the reflective writing called CREATE, which was stated to be very popular. Mini-CEX and DOPS were thought to be simple to complete and suggested to be ideal for weekly or fortnightly consumption rather than daily consumption.

Theme 2: Decreased Subjective Norms Towards Pro-CP; Category: Readiness of Pro-CP End-Users

The second theme relates to the subjective norms, which is the belief of essential others whose view of Pro-CP influences the belief and intention to use Pro-CP. The immediate stakeholders of Pro-CP in the current study are the students, faculty members, and CIs. Students, as immediate end users of Pro-CP, felt competence is an important attribute to be developed and obtained before integrating into the workforce. This suggests their positive influence over Pro-CP use in cultivating clinical competence. Students in this study also believe the support for Pro-CP lies significantly in the faculty members and CIs teaching using Pro-CP. Students showed concern over the successful use of Pro-CP, as its use might increase the CIs' workload.

Theme 3: Increased Self-Efficacy Towards Pro-CP; Category: Capability Towards Competence

Theme 3 showed several elements which promoted students' self-efficacy or capability in developing their clinical competence.

Students believed the sensitivity of Pro-CP to detect many scopes for learning and the ability to detect errors over a difficult or hard-to-reach zone of learning with traditional assessments will promote their clinical performance. The transparent and explicit criteria in mini-CEX highlight student mistakes during history taking and aid them in autocorrecting themselves over specifics such as questioning skills and body language. Students believe Pro-CP creates awareness of one's mistakes and is more relevant in achieving these aspects of learning, which the previous assessment failed to detect. Another student pointed towards the clear and detailed instructions in the items in Pro-CP (mini-CEX, DOPS, CREATE, SMART Learning Outcomes, Feedback and Scoring Rubrics) encompass all the elements required in subjective and objective assessment.

Another element of self-efficacy relies on the students' perception of Pro-CP being well organised for all three items (mini-CEX, DOPS and CREATE) and providing tailored feedback individually. Another significant perspective shared was the improved clinical teaching with Pro-CP use. Students commented on the comprehensive teaching of the particular area identified and taught during clinical supervision with Pro-CP. Furthermore, students highlighted appropriate feedback from the CIs, as Pro-CP is believed to guide CIs in specific teaching and feedback delivery. The student's critical thinking skills are perceived as a challenging task to be taught and are believed to be facilitated by the CREATE item in Pro-CP. The CI's teaching from the observed students' errors with a demonstration on the correct method of performing the skill by the CI is much appreciated as it guided the student to perform better in the next encounter. A mutual two-way dialogue was highlighted as being present between the CIs and students to discuss in depth the unachieved areas, which was perceived to be a great quantum leap in clinical teaching.

Theme 4: Increased Learning Autonomy Towards Pro-CP; Category 1: Self-Regulated Outcome and Feedback

The increased learning autonomy towards Pro-CP emerged from several perspectives shared by the students. The SMART Learning Outcomes embedded in mini-CEX, DOPS, and CREATE, together with the self-regulated feedback strategies, were appreciated and claimed to have motivated them to be more accountable towards their own learning by attempting to put more effort into meeting the targeted goal, and students believed they had improved from this strategy. The students also admitted that they have taken more responsibility for their learning by seeking more knowledge or practicing the required skill in order to achieve the initial learning outcome, which is believed to assist in their subsequent clinical performance. This was also believed to have made them active learners and motivated them to pursue clinical learning. Another reality pointed out was the reality that learning from error is an ongoing phenomenon, and Pro-CP was perceived as a document of reference for learning.

Theme 4: Increased Learning Autonomy Towards Pro-CP; Category 2: Self-Directed Learning by Criterion Scoring

Another element in Pro-CP highlighted to encourage students to put more effort into their learning was the transparency in the scoring. The scoring rubric enables students to benchmark their low score and make attempts to improve in the subsequent week to achieve a higher score. The ability to see improvement in oneself was much appreciated by the students. The scoring rubric with criterion reference allows students to self-assess and to motivate themselves to make improvements to attain better results.

Theme 5: Need for Institutional Support

Theme 5 pertained to training, manpower support, and the perceived clinical

environment for Pro-CP scheduling. Most of the students appreciated and preferred to use Pro-CP, provided there was enough training and an adequate number of CIs provided for its effective implementation. Students felt Pro-CP implementation needed to be properly scheduled. Having an appropriate timetable was believed to reduce stress among the CIs and give students time to prepare ahead of time.

DISCUSSION

The current study presents an in-depth understanding of how competence behaviour is cultivated by means of the TPB framework. In this study, physiotherapy students' attitudinal beliefs, normative beliefs, and control beliefs clearly influenced their intention to use Pro-CP. To date, there has been no study examining the cultivation of competency behaviours in health professions graduates. This section discusses in depth how the behaviour is cultivated and the factors contributing to its cultivation. The five themes generated from this study are discussed across the three main belief constructs in the TPB framework.

Behavioural Beliefs Towards Pro-CP

Theme 1 on increased attitudinal behaviour towards clinical competence arises from “the perceived ease of use” and “the perceived usefulness”, in relation to the use of Pro-CP and indicates increased attitudes as reported by Ajzen (12) and thus increased intention to use Pro-CP. Six important categories, namely improving clinical skills, soft skills cultivation, fostering higher-order thinking, sampling various cases, prior knowledge activation and feasibility, defined in Theme 1. First, the enhanced clinical skills are evident from mini-CEX, and DOPS is perceived as useful in bringing a comprehensive view of the patient assessment, and the well-detailed stepwise instruction is considered a guideline for students to perform patient assessment effectively. This is consistent with the mini-CEX, which is reported to

improve clinical skills and sharpen attitudes and behaviours necessary for effective patient care (29). In his interview, students appreciated the assessment approaches that promote a motivating learning experience in the mini-CEX. The mini-CEX was found to be particularly useful for history taking, while reflective writing with the CREATE item promoted clinical reasoning and better prepared students for patient assessment. Improvements in history-taking and procedural skills were perceived after using Pro-CP, and changes in clinical performance as a whole were claimed, as students asserted that they could see the patient's impairment from function rather than disease.

This is similar to Cheon's et al. study of mobile learning among college students (21), which found that the perceived usefulness and ease of use of mobile learning indicated an increased intention to use mobile devices for coursework. The usefulness and ease of using mobile devices in courses increased students' attitudes towards using m-learning in courses, but behavioural control was the biggest factor in their intention to use m-learning (mobile-learning). Second, the current study asserts that the use of Pro-CP fosters interpersonal skills, which are an element of clinical competence (9). Third, higher-order thinking skills, an important attribute of competence as defined by Epstein and Hundert (30), are evident as students report improved critical thinking, problem-solving skills, and clinical reasoning, which facilitated the development of an appropriate treatment plan. Specifically, CREATE was cited as a guide for reflection, critical thinking, and clinical reasoning skills. These salient behavioural beliefs reported by students are important evidence of positive attitudes towards Pro-CP.

The usefulness of Pro-CP was also emphasised in terms of the variability of cases needed to see real improvements, as students were concerned that the repeated use of Pro-CP in simple cases might hinder the identification of areas for improvement.

This is the first principle in assessment recommended by van der Vleuten et al. (10) in his programmatic assessment model, which is to use large sampling across multiple cases to improve the reliability of assessment data. Fourth, students believed that the use of Pro-CP activated their prior knowledge, which helped them in clinical learning. Activation of prior knowledge is one of the key elements of adult learning theory, and the presence of such a feature demonstrates the suitability of Pro-CP as a workplace-based assessment tool. Finally, this study emphasised feasibility as one of the utility formulas in assessment by recommending the use of Pro-CP on a weekly or biweekly basis and not on a daily basis due to the lengthy documentation process.

The positive attitude reported in this study directly contributes to increased intention to use Pro-CP. The current results clearly answer the first research question about the mechanism of cultivating competence behaviour with Pro-CP. As Steinmetz et al. (14) state, changing beliefs is the main cause of altering motivation change and is most successful with intention, so it directly changes behaviour. In concordance with this finding, measuring students' beliefs is believed to provide a deeper understanding of how Pro-CP mechanism works to cultivate competent behaviour. A similar positive perception was reported for a competency assessment using portfolio (31), who changed their attitudes, scholastic thinking, and thinking skills after using a programmatic portfolio. Therefore, it is imperative to consider the pedagogical implications of assessment to achieve the desired learning effects (29).

Similarly, when teachers used technology to design and deliver a lesson, attitude towards behaviour was found to have twice the impact of subjective norm and more than three times the impact of the PBC (21). Lee et al. (32) found that attitude towards behaviour was a significant predictor of the direct determinant of attitude towards behaviour ($p < 0.001$). He concluded that

attitude towards behaviour has a strong influence on intention and makes it easier for one to design an effective programme by providing specific guidance and support in clinical decision-making. Teachers cared less about what others thought about such an application. Similarly, Davis' factor analysis revealed that the perceived ease or difficulty of performing the behaviour was the most important factor in forming intention, although attitudes and subjective norms played a significant role in predicting it (17). The perceived ease or difficulty of performing the behaviour can be explained by the reduced psychological resistance due to the valuable experiences acquired through m-learning (21). Also, the positive learning experiences that the students in the present study had with the structured Pro-CP minimise the cognitive load when using Pro-CP.

Normative Beliefs

Normative beliefs refer to whether the vital referent group or person approves or disapproves of the performance of a certain behaviour (12). In our study, the important reference groups were faculty members and CIs' perceptions towards Pro-CP, which are considered important to gauge intention to use Pro-CP. Perceptions of CIs and support of clinical affiliation for Pro-CP influence the use of Pro-CP to some extent. This is consistent with Cheon's et al. (21) study of the significant relationship between instructors, subjective norm, and intention. As our study shows, the commitment of CIs and the support of the programme director towards Pro-CP affect the motivation to comply (12) with Pro-CP. These two attributes contribute to subjective norms related to Pro-CP use, which ultimately influence the intention to use Pro-CP.

Control Beliefs (Perceived Control Belief)

The third important element predicting human action is "perceived behavioural control" (PBC) (14), and this control belief is influenced by factors that enable or

hinder the execution of the behaviour (12). In this study, the control beliefs related to Pro-CP are related to hindering factors from Theme 5: Institutional Support. Adequate manpower, time for training, and time to complete Pro-CP are perceived as hindering the successful implementation of Pro-CP. Students noted that CIs did not have enough time to provide feedback, which impacted their intent to use Pro-CP. This was because students felt the CIs needed more training. They suggest that colleges should focus on faculty development and providing adequate resources to promote perceived behavioural control, thereby increasing the intention to perform the desired behaviour. Similarly, Davis reported in his study that students' ability to overcome difficulties in their lives inhibits their intention to stay in school. Similarly, a meta-analysis on health-related behaviours reported that PBC has a stronger relationship with physical activity behaviours and dietary behaviours (33).

The role of teachers is critical in the adoption of a new strategy (21), and professional development and institutional support are important. Although control beliefs are rather insignificant compared to behavioural beliefs in this study, they have a great influence on a number of Pro-CP beliefs. Another interesting attribute that outperforms PBC in determining intention to use Pro-CP is self-efficacy. Self-efficacy is considered to outperform PBC, meaning that empowering students to use a tool confidently leads to a greater likelihood of adopting the tool or technology (21).

Self-Efficacy

Self-efficacy is the assessment of how well one can perform the courses of action required to cope with prospective situations (34). Several positive beliefs contributed to students' self-efficacy in using Pro-CP, which directly promoted their intention to use it. Improving history-taking skills through mini-CEX, improving procedural skills through DOPS, and strengthening

critical thinking, reflective, and problem-solving skills all contributed to their self-efficacy. Higher levels of self-efficacy related to computers lead to higher levels of behavioural intentions and use of information technology (35). As Cheon et al. (21) elaborate, a person who believes he or she has mastered a particular skill or activity has a higher intention to perform the skill or activity. A similar study was conducted by Dinther et al. (36), highlighting self-efficacy as a cornerstone in predicting the outcome of competency assessment.

Dinther et al. (36) focused on the development of student self-efficacy as it influences motivation. According to Dinther, feedback and experience with one's own performance are considered the second persuasive source for the development of self-efficacy information. He also emphasises that students' insight into the form of authentic assessment and the quality of feedback are the best predictors of self-efficacy. He also points out that students with lower self-efficacy have lower levels of competence and advocates that those institutions should focus on the development of self-efficacy as the most important attribute for predicting higher levels of competence. This is consistent with the current study, in which students felt that

CI exhibited encouraging clinical teaching behaviours that focused on task-specific feedback that promoted their understanding, thus enhancing students' self-efficacy. In addition, while PBC has the strongest path coefficient for intention (17), the experience of mastery is considered authentic success in performing a task in a challenging situation, and self-efficacy is considered the most important source of influence. Figure 2 shows the intention to use Pro-CP as per the TPB theory.

CONCLUSION

The current study provided insight into how Pro-CP promotes clinical competence in physiotherapy students. Although motivation to follow Pro-CP might be influenced by the degree of commitment of CIs to use Pro-CP, as it contributes little to subjective norms, students' and CIs' very positive attitudes towards the items of Pro-CP promoted the intention to use Pro-CP. Importantly, competence behaviour is not entirely under individual volitional control but requires strong institutional support where a strong locus of control belief makes additional efforts to increase the intention to use clinical competency. The items and the learning process with Pro-CP influenced the construction of student learning and

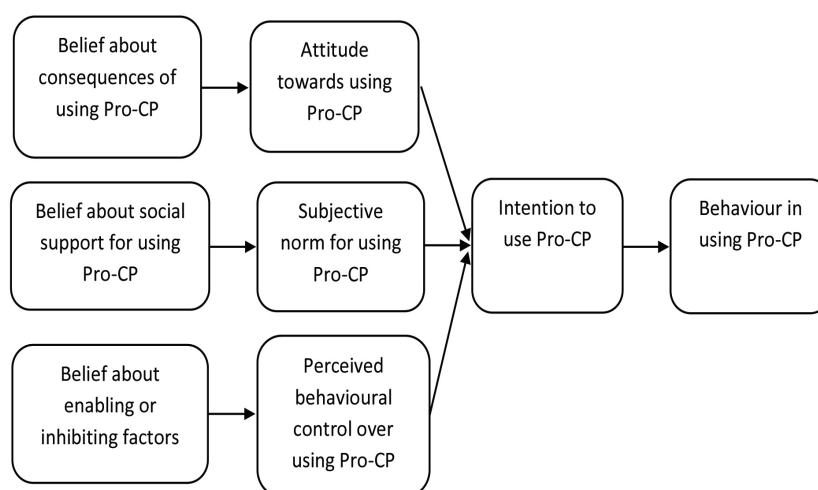


Figure 2: Summary of consequences of Pro-CP in relation to TPB model.

prompted changes in clinical practice. Timely feedback with reflective activities facilitated by CIs and the transparency of rubrics contributed significantly to students' competency behaviours.

Although subjective norms and PBC have the greatest influence on intention to use Pro-CP, strong behavioural beliefs contribute greatly to self-efficacy, which has a greater influence than PBC on intention to become competent. By examining the significant determinants of the attitudinal constructs of TPB, this study provides the foundation for further research aimed at gaining new insights into the development of assessment instruments to measure competence behaviour among health professional graduates.

This new information will help health professional educators develop Pro-CP to effectively measure the competence of health professions graduates and enable sound decision-making regarding passing or failing during workplace performance. Because Pro-CP is a complex assessment strategy, it requires a major cultural shift in assessment practices in a given higher educational institution.

ACKNOWLEDGEMENTS

A sincere thank you to all the students and staff of the participating universities for their great contribution in implementing the Pro-CP instrument and supporting the data collection for this research work. This study was fully funded by a research university grant from Universiti Sains Malaysia (Ref. no.:1001/PPSP/812204).

ETHICAL APPROVAL

Ethical approval was obtained from the Jawatankuasa Etika Penyelidikan, Universiti Sains Malaysia (USM/JEPeM/15070249).

REFERENCES

1. Stoikov S, Gooding M, Shardlow K, Maxwell L, Butler J, Kuys S. Changes in direct patient care from physiotherapy student to new graduate. *Physiother Theory Pract.* 2021;37(2):323–30. <https://doi.org/10.1080/09593985.2019.1628138>
2. Bhavani V, Ajit SDK, Yew SF. Navigating physiotherapy competence standards: the triad alignment of key stakeholders. *Educ Med J.* 2019;11(3):1–74. <https://doi.org/10.21315/eimj2019.11.3.8>
3. O'Connor A, Krucien N, Cantillon P, Parker M, McCurtin A. Investigating physiotherapy stakeholders' preferences for the development of performance-based assessment in practice education. *Physiotherapy.* 2020;108:46–54. <https://doi.org/10.1016/j.physio.2020.04.003>
4. Govaerts M, van der Vleuten CP. Validity in work-based assessment: expanding our horizons. *Med Educ.* 2013;47(12):1164–74. <https://doi.org/10.1111/medu.12289>
5. Chacko TV. Moving toward competency-based education: challenges and the way forward. *Arch Med Health Sci.* 2014;2(2):247. <https://doi.org/10.4103/2321-4848.144365>
6. Holmboe ES, Sherbino J, Long DM, Swing SR, Frank JR, Collaborators IC. The role of assessment in competency-based medical education. *Med Teach.* 2010;32(8):676–82. <https://doi.org/10.3109/0142159X.2010.500704>
7. Harris P, Snell L, Talbot M, Harden RM, Collaborators IC. Competency-based medical education: implications for undergraduate programs. *Med Teach.* 2010;32(8):646–50. <https://doi.org/10.3109/0142159X.2010.500703>
8. Miller GE. The assessment of clinical skills/competence/performance. *Acad Med.* 1990;65(9):S63–7. <https://doi.org/10.1097/00001888-199009000-00045>

9. Epstein RM. Assessment in medical education. *N Engl J Med.* 2007;356(4):387–96. <https://doi.org/10.1056/NEJMra054784>
10. van der Vleuten CP, Schuwirth L, Driessen E, Dijkstra J, Tigelaar D, Baartman L, et al. A model for programmatic assessment fit for purpose. *Med Teach.* 2012;34(3):205–14. <https://doi.org/10.3109/0142159X.2012.652239>
11. Ajzen I, Fishbein M. Belief, attitude, intention and behavior: an introduction to theory and research. Reading, MA: Addison-Wesley; 1975.
12. Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process.* 1991;50(2):179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
13. Armitage CJ, Conner M. Efficacy of the theory of planned behaviour: a meta-analytic review. *Br J Soc Psychol.* 2001;40(4):471–99. <https://doi.org/10.1348/014466601164939>
14. Steinmetz H, Knappstein M, Ajzen I, Schmidt P, Kabst R. How effective are behavior change interventions based on the theory of planned behavior? *Zeitschrift für Psychologie.* 2016;224(3):216–33. <https://doi.org/10.1027/2151-2604/a000255>
15. Ajzen I. The theory of planned behaviour is alive and well, and not ready to retire: a commentary on Sniehotta, Presseau, and Araujo-Soares. *Health Psychol Rev.* 2015;9(2):131–7. <https://doi.org/10.1080/17437199.2014.883474>
16. Ajzen I, Klobas J. Fertility intentions: an approach based on the theory of planned behavior *Demogr Res.* 2013;29(8):203–32. <https://doi.org/10.4054/DemRes.2013.29.8>
17. Davis LE, Ajzen I, Saunders J, Williams T. The decision of African American students to complete high school: an application of the theory of planned behavior. *J Educ Psychol.* 2002;94(4):810–9. <https://doi.org/10.1037/0022-0663.94.4.810>
18. Francis J, Eccles MP, Johnston M, Walker AE, Grimshaw JM, Foy R, et al. Constructing questionnaires based on the theory of planned behavior: a manual for health services researchers. Newcastle upon Tyne, UK: Centre for Health Services Research, University of Newcastle upon Tyne.
19. Ajzen I. From intentions to actions: a theory of planned behavior, action-control: From cognition to behavior. New York: Springer; 1985. https://doi.org/10.1007/978-3-642-69746-3_2
20. Ajzen I. Attitudes, personality, and behavior. UK: McGraw-Hill Education; 2005.
21. Cheon J, Lee S, Crooks SM, Song J. An investigation of mobile learning readiness in higher education based on the theory of planned behavior. *Comput Educ.* 2012;59(3):1054–64. <https://doi.org/10.1016/j.compedu.2012.04.015>
22. Malterud K, Siersma VD, Guassora AD. Sample size in qualitative interview studies: guided by information power. *Qual Health Res.* 2016;26(13):1753–60. <https://doi.org/10.1177/1049732315617444>
23. Francis JJ, Eccles MP, Johnston M, Walker A, Grimshaw J, Foy R, et al. Constructing questionnaires based on the theory of planned behaviour: a manual for health services researchers. 2004;2010:2–12.
24. Kiger ME, Varpio L. Thematic analysis of qualitative data: AMEE Guide No. 131. *Med Teach.* 2020;42(8):846–54. <https://doi.org/10.1080/0142159X.2020.1755030>
25. Saldaña J. First cycle coding methods. In: The coding manual for qualitative researchers. USA: Arizona State University, USA; 2009. p. 45–145.
26. Onwuegbuzie AJ, Dickinson WB, Leech NL, Zoran AG. A qualitative framework for collecting and analyzing data in focus group research. *Int J Qual Methods.* 2009;8(3):1–21. <https://doi.org/10.1177/160940690900800301>

27. Stalmeijer RE, McNaughton N, Van Mook WN. Using focus groups in medical education research: AMEE Guide No. 91. *Med Teach*. 2014;36(11):923–39. <https://doi.org/10.3109/0142159X.2014.917165>
28. McGrath C, Palmgren PJ, Liljedahl M. Twelve tips for conducting qualitative research interviews. *Med Teach*. 2019;41(9):1002–6. <https://doi.org/10.1080/0142159X.2018.1497149>
29. Alves de Lima A, Henquin R, Thierer J, Paulin J, Lamari S, Belcastro F, et al. A qualitative study of the impact on learning of the mini clinical evaluation exercise in postgraduate training. *Med Teach*. 2005;27(1):46–52. <https://doi.org/10.1080/01421590400013529>
30. Epstein RM, Hundert EM. Defining and assessing professional competence. *JAMA*. 2002;287(2):226–35. <https://doi.org/10.1001/jama.287.2.226>
31. Gadbury-Amyot CC, Kim J, Palm RL, Mills GE, Noble E, Overman PR. Validity and reliability of portfolio assessment of competency in a baccalaureate dental hygiene program. *J Dent Educ*. 2003;67(9):991–1002. <https://doi.org/10.1002/j.0022-0337.2003.67.9.tb03697.x>
32. Lee J, Cerreto FA, Lee J. Theory of planned behavior and teachers' decisions regarding use of educational technology. *J Educ Tech Soc*. 2010;13(1):152–64.
33. McEachan RRC, Conner M, Taylor NJ, Lawton RJ. Prospective prediction of health-related behaviours with the Theory of Planned Behaviour: a meta-analysis. *Health Psychology Review*. 2011;5(2):97–144. <https://doi.org/10.1080/17437199.2010.521684>
34. Bandura A. Guide for constructing self-efficacy scales. Self-efficacy beliefs of adolescents. 2006;5(1):307–37.
35. Cameron R, Ginsburg H, Westhoff M, Mendez RV. Ajzen's theory of planned behavior and social media use. *Am J Psychol Res*. 2012;8(1).
36. Dinther M, Dochy F, Segers M, Braeken J. Student perceptions of assessment and student self-efficacy in competence-based education. *Educ Stud*. 2014;40(3):330–51. <https://doi.org/10.1080/03055698.2014.898577>