



## Original research

# Inquiry-based learning and clinical reasoning scaffolds: An action research project to support undergraduate students' learning to 'think like a nurse'



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## ABSTRACT

A period of re-negotiation is expected when introducing a new teaching and learning approach in a Bachelor of Nursing course. This study, underpinned by a social constructivist framework, used action research to uncover the interactions, challenges and outcomes when implementing an inquiry-based learning approach to support the development of students' clinical reasoning and capability to think like a nurse. Data collection involved non-participant observation of 32 tutorial groups (600 first-year students and 8 teachers) over the first two weeks of semester. Analysis was informed by Charmaz's social constructivist approach. The findings revealed three interconnected constructs: *Opting in and out* (students), *Driving and reframing* (teachers) and *Creating and realising new understandings* (both students and teachers). Introducing a new approach necessitated conscious planning and deliberate behaviour change on behalf of the teacher and student. Use of an inquiry-based learning approach which embedded clinical reasoning, investigative prompts and learning scaffolds in the form of case exemplars assisted students to 'think like a nurse'.

## 1. Introduction

Graduate nurses are expected to implement evidence based and person-centred care as part of routine practice. Competent practice relies on the graduate nurses' ability to undertake purposeful clinical reasoning, which requires metacognitive processing (Banning, 2008). Nursing students' need to be taught to practice clinical reasoning during their undergraduate courses so as to develop the capacity to provide safe and quality, person-centred care (Edelen and Bell, 2011; Levett-Jones et al., 2010; Simpson and Courtney, 2002). Both the teaching of and learning about clinical reasoning is complex, as each unique practice encounter guides continued learning through subsequent reflection and experience (Lapkin et al., 2010; Tang and Sung, 2012). In this research, clinical reasoning is a systematic process where students use thinking strategies to consider the person and context, collect and process information (review, relate, recall knowledge, make inferences), synthesise it to identify problems, formulate goals, determine and implement interventions, then evaluate the actions taken and reflect on the experience to inform new learning. This clinical reasoning process (Fig. 1) employs the work of Levett-Jones et al. (2010) with selected cues added to embed local curricular threads such as person-centred care and evidence-based practice. It is clinical reasoning that constitutes 'thinking like a nurse' and the profession specific know-how that students need to acquire to practice as a nurse. However, the

concept clinical reasoning is abstract but use of a term such as 'think like a nurse' is an easy metaphor for students and teachers to apply.

The task for nurse academics is to provide learning experiences which promote knowledge and cognitive skills that inform students' development of clinical reasoning in nursing specific contexts. How teaching approaches and frameworks best facilitate students' acquisition of the clinical reasoning process is the core question that drove this study. This issue was identified in a Bachelor of Nursing curriculum review identifying inconsistent teaching practices, terminology and frameworks that created barriers to students' acquisition and application of clinical reasoning. Further acknowledged in this study, is that learning is socially constructed and the more engaged students are in learning, better outcomes are evidenced (Bernard, 2015; Theobald et al., 2018). Subsequently the adaptation of a well-known clinical reasoning framework (Levett-Jones et al., 2010) and a reframe of teaching and learning approaches to adopt an inquiry-based (IBL) approach was planned and this study reports the introduction of this new approach in a large undergraduate nursing subject.

## 2. Background and literature

It is widely recognised that higher education should encourage students to adopt responsibility for their learning through engagement with active learning experiences (Adams Becker et al., 2017; Johnson

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Fig. 1. Clinical reasoning cycle (reproduced by kind permission of Elsevier from Levett-Jones et al., 2010).

et al., 2015; Vaughan and Vaughan, 2014). Inquiry-based learning (IBL) approaches are credited with supporting authentic learning experiences in practice-based disciplines and align well with the cognitive challenges of nursing clinical practice (Levett-Jones et al., 2010; Tang and Sung, 2012). Additionally, IBL approaches encourage group interaction and reflection (Horne et al., 2007), and are motivating and enjoyable ways to learn (Spronken-Smith, 2012; Kirwan and Adams, 2009). In this study, IBL is viewed as ‘... a range of instructional practices that promote student learning through student-driven and instructor-guided investigations of student-centred questions’ (Justice et al., 2007, p. 202). IBL is widely used in Australian higher education contexts yet there is little consensus on what practices and task forms this represents (Aditomo et al., 2013). What is agreed is that critical thinking is a common element within IBL approaches and relevant to nursing, is an essential constituent of clinical reasoning (Rochmawati and Wiechula, 2010).

Undergraduate nursing students require teaching and learning approaches that support their transfer of learning from the university to the health workplace, to enable them to make sense of clinical situations, to think like a nurse, and to engage with practice to develop competence as a nurse (Tang and Sung, 2012; Wells et al., 2009). In this study, an inquiry-based student and teacher interaction was identified as an approach most likely to complement the introduction of a new clinical reasoning framework to enable higher order thinking and students' future transfer of learning, university to clinical practice. Students were introduced to the clinical reasoning framework using animation, colour coding and explanation. Worked exemplars highlighted steps in the clinical reasoning framework and question prompts progressively moved students through developing their understanding of the nurse's role and thinking like a nurse.

### 3. Research design

This study using an action research design, aimed to ascertain if implementation of new IBL and teaching interactions using a clinical reasoning framework and accompanying learning scaffolds, supported Bachelor of Nursing students' (n = 600) learning interactions and teachers' (n = 8) teaching behaviours. It involved three action cycles, 1) exploration of issues and identification and development of resources to suit the local context; 2) introduction and transition to the new IBL approach, [reported here]; and 3) a final action cycle evaluating student experience. Cycle two sought to address the following questions:

1. How do students and teachers exhibit active learning approaches in addressing tutorial clinical cases?
2. How do students employ clinical reasoning in responding to learning activities that are framed to support ‘thinking like a nurse’?
3. In what way do purpose-built IBL and clinical reasoning resources scaffold student learning and staff teaching behaviours?

This study was underpinned by a social constructionist theoretical frame. Action research is used widely in education and healthcare and involves a cyclic process of inquiry that aims to improve the quality of practice through a planned iterative process of engaging with others to support practice improvement (Kemmis et al., 2014). Social constructionist theory explores how social processes occur, and in this study, was used to uncover how teachers and students practised new ways of teaching and learning clinical reasoning. Founded by Dewey the key tenets of this theory are engagement and co-construction of learning, and assembly of knowledge within a social context which enables learners to collaborate with each other and to explore different perspectives supported by a teacher who facilitates learning through

interaction (Biggs and Tang, 2011; Swan, 2005).

The study was conducted at one Australian university within a large Bachelor of Nursing first year nursing theory subject; the first in a series of five core subjects focusing on developing students' understanding of the nurse role and related practice. Prior to this study, students attended face to face tutorials (groups of 25 students) and worked in traditional and passive ways with the teacher leading all learning activities. Students worked either alone or were directed into small groups, responding to activities when requested by the teacher. The new approach embedded IBL as the planned tutorial approach to support learning interactions and develop students' capability to 'think like a nurse' in preparation for workplace placement. Purpose-built inquiry-based learning and teaching resources grounded in the steps of clinical reasoning (Fig. 1; Levett-Jones et al., 2010), containing exploratory prompts, formed the foundation of the learning approach. In week one, students were introduced to the clinical reasoning framework using an animated explanation and colour coded process. Worked exemplars highlighted clinical reasoning and question prompts progressively moved students through developing their understanding of the nurse role and thinking like a nurse. These learning scaffolds were embedded in subsequent weeks as authentic clinical cases that linked to Australian health priorities (e.g. diabetes, dementia). Teachers were prepared prior to the start of semester in a one hour workshop and then were asked to actively focus on facilitating students' learning by working through an inquiry-framed mode linked to the clinical reasoning framework and learning scaffolds. Teacher tutorial hours undertaken ranged between 8 and 16 h. Teacher guides were provided to support the embedding of IBL and the clinical reasoning framework as well as to enable consistency between teachers and tutorial groups.

#### 4. Participants

All students (n = 600) who attended tutorials and agreed to be observed during two consecutive weeks were included. There were no exclusion criteria. All teachers (n = 8) teaching in the unit agreed to participate and to the researchers' observing tutorial classes. This study had ethical approval, no identifying data was collected, researchers had no concurrent teaching or learning relationship with participants and participation was voluntary.

#### 5. Data collection

Qualitative data were generated by non-participant observation and researcher field notes and memos. Tutorial classes (n = 32) of 25 students each were observed for two hours over the first two weeks. Structured non-participant observation was undertaken by two researchers who were arbitrarily allocated to tutorial groups. An observation template was developed, piloted to determine utility, adapted and used to collect data. The template was based on the study's underpinning social constructionist theoretical frame and core tenets of IBL, and was designed to focus the researcher's observation on student and teacher interactions, whether learning was stimulated by inquiry, and how self-directed students were in using the learning scaffolds. The template enabled recording of students' observed knowledge acquisition and how technology was used. Researchers were unobtrusive, observing whilst seated or at times moving about the tutorial, without interrupting the learning interaction. Researchers also kept field notes which subsequently supported formation of memos as the basis for analytical interpretations.

#### 6. Data analysis

Data analysis was informed by Charmaz's (2014) social constructivist methods and five sensitising concepts (Blumer, 1969) identified through initial review of the literature. Sensitising concepts informed the initial coding of data and were, connected learning,

collaboration, socialisation, inquiry focused, and active learning.

During observations, researchers completed field notes, then ideas and reflections were memoed and these became a further source of data for interpretation. Data were then interrogated and focused codes established. The process of constant engagement and comparison of data, led to generation of analytical interpretations which were tested out with the existing literature. The researchers worked independently and then collaboratively to reach agreement with the analysis. These analytical procedures assist with demonstrating study rigour.

#### 7. Findings

The over-arching analytical interpretation generated from this study was *Reconstructing the learning interaction*. As expected, the introduction of new IBL approaches led to a change in interactions between teachers and students that occurred due to the reconstruction of learning. *Reconstructing the learning interaction* comprises three interconnected constructs: *Opting in and out (students)*; *Driving and reframing (teachers)*; and *Creating and realising new understandings (both students and teachers)*. As part of *Reconstructing the learning interaction* change to new learning behaviours was observed to be easy for some teachers as they took on active approaches and transitioned smoothly. Others were challenged and were observed to test out new teaching approaches, transitioning back and forth from previous familiar passive approaches, then deliberately re-focusing on making the change to IBL. How these behaviours unfolded and reformed, the nature of student/student and student/teacher exchanges within learning activities, forms the *reconstruction of learning interaction*. The shape of exchanges and what teacher (*driving and reframing*) and student behaviours (*opting in and out*) contributed to how successful learning was reconstructed.

In terms of changing interaction, students were asked to specifically engage in small group inquiry focused learning practises. Changes necessitated students move from the previous largely passive and private role to an active, public and investigative learning style based in discussion. Co-construction of learning was evident within small groups as manifest in the following field note.

Field note - Room really humming with conversation. Students actively formed groups of four to six members on request of the teacher yet at times moved to work in smaller interactive groups of two to three, then moved back to the larger working group.

Changes observed were students being more deliberate and focused in investigating and formulating case question responses, discussing and debating merit and carefully appraising their answers within their small group, before posing it for wider class comment. Students' recognition of group accountability for an accurate learning outcome is acknowledged (Billings and Halstead, 2015) and likely served as a driver of student interaction and engagement in developing understanding of the issues in the IBL case.

##### 7.1. Opting in and out

In this study students vacillated in and out of the IBL case activity. Students were distracted easily when assigned a learning task and were observed to actively transition in and out of the learning activity. Engaging with multiple stimuli in brief snatches of time while concurrently participating in learning was evident in the following observed practises.

Field note - Participants transitioned quickly out of learning [about the case] to view information technology (IT) devices. Aspects observed were shopping; checking messages for other classes; responding to social media notifications.

Students were observed to frequently multitask during the prescribed small group learning period. The use of multiple IT devices, such as laptops or smart phones, all running different web pages to

investigate an aspect of learning, was frequently observed. Many students used split screen functions to enable both learning activities and outside class options, such as online shopping, being viewed at once. Engaging with multiple activities highlights the transitions in and out students undertake within the learning context.

Students actively engaged in small IBL groups by contributing ideas, sharing relevant clinical experiences, posing questions to each other and brainstorming answers. These exchanges in views were observed to be deliberate in a small group before some agreement on a response was shared to subsequently inform the larger class perspective.

Field note: Students sought clarification about how a patient's symptoms might arise ... explicitly seeking depth of understanding regarding the pathophysiology of the case patient's disease state.

The flexible nature of IBL and its emphasis on discovery-orientated approaches (Spronken-Smith, 2012) fostered students' movement in and out of the learning interaction. Students remained in touch with the learning activity taking responsibility to feedback to the class, responses to assigned questions. Encouraging small team, student-to-student interaction around the case questions and referral to the clinical reasoning framework served as a supportive approach. The use of strategies like brainstorming responses on paper or a white board supported discussion with peers and examination from multiple perspectives. Teacher investigative prompts supported deep approaches to learning. In this way, students' existing knowledge was applied or further information found to support responses. Teacher behaviours and reference to case questions kept students on task serving to redirect students to *Opt in* and return from periods of *Opting out* within the learning interaction.

Within IBL students' independent exploration of concepts and solutions singly on a phone or laptop followed by a return to the group to share answers, is a legitimate element of learning. The analytical interpretation of student behaviour as opting in and out of the learning though was more about interruption and disengagement from the focus of the learning activity. Use of IT encouraged a disconnection from other students, as users independently operate technology. Yet 'bring your own devices' (BYOD) do have value in providing learners with capability to easily access and share findings through connection to multiple information platforms. The reality is that new technologies and learning devices will continue to emerge generating innovative teaching practices and redesign of learning spaces (Johnson et al., 2015) however, it also creates further opportunity for student distraction that interrupts learning and how it impacts on outcomes achieved is unknown. Thus, what technology adds to learning in one way may distract in another.

Inquiry-based learning seeks to engage the learner and build understanding of more complex situations, drawing on past experience and the perspectives of others in the group (Hamilton et al., 2012; Vogt and Schaffner, 2016). In this way IBL needs to be paced by both the teacher and students to accommodate collaborative idea sharing, interactions and cognitive processing. The learning transitions observed in this study where students used online options to access information immediately align well with IBL approaches as well as the predicted growth in 'bring your own mobile learning devices', reported as an emerging international technologies trend in learning and teaching (Johnson et al., 2015). It does however beg the question; what level of learning was occurring as a consequence of the transition in and out of the tutorial activity? Was deep learning occurring or are surface approaches more likely? If students are aware of their multitasking behaviour, yet self-regulate deep learning in IBL situations, as this is a familiar behaviour pattern is questionable and one might conclude that learning is impeded by multitasking. Certainly, further investigation is required.

A criticism of the IBL approach is the uncertainty in how the student group functions to address learning tasks (Holaday and Buckley, 2008). As student groups form, learning activity parameters are negotiated in

the moment. Student group processes need to be continually monitored and facilitated by teachers to maintain a focus on learning (Holaday and Buckley, 2008; Summerlee and Murray, 2010) and specific to this study, was facilitation by teachers to develop understanding and application of clinical reasoning within cases. Students positioned themselves to work independently at times, yet sat within a small group structure, allowing for the option of engaging or withdrawing in certain aspects of the inquiry-based activity.

Field note: directed by the teacher to focus on the pre-tutorial activity, two students transitioned back into the main tutorial session. As the teacher overviewed the case, critical questions were posed by the teacher and three more students re-joined the main tutorial to pursue the learning task and verbalise a response.

## 7.2. 'Driving and reframing'

Teachers took both overt and subtle roles as part of the IBL approach to drive and reframe teaching activities moving from the role of leader to facilitator of others' learning. Changes in teacher behaviour necessitated a shift in class dynamics and atmosphere. The teachers constructed how they directed, engaged, and used resources; they defined the role they took in the learning situation although this was observed to be manifest in different ways in each of the 32 tutorial groups. Some adapted and readily adopted the new approach, reframing teaching practises quickly while others took time or were resistant and challenged.

Field note: Teacher controlling pace of interactions, little opportunity for student small group self-direction. Whole group slow to work through case and teacher says to class 'we are way behind where we should be'.

At the end of week two all teachers came to the same end point of facilitating learning using explicit IBL approaches and clinical reasoning was integrated as a framework to support students to develop the capacity to 'think like a nurse'.

In driving a change to IBL, both teachers and students needed time to build rapport and establish a new partnership which promotes active and collaborative learning interactions. This partnership develops as both enthusiastically work at the approach in their own way (Spronken-Smith, 2012). The teacher is the key, the driver in establishing how the learning will unfold, and it is student-orientated teacher behaviour which promotes engagement with learning (Baeten et al., 2010; Theobald et al., 2018). Concurrent with changes in teacher behaviour, students were often observed to act as passive recipients of learning until they felt supported and comfortable to interact in the new learning environment. Teachers who created a positive culture and encouraged any student contribution, quickly acquired a supportive and sharing partnership with students.

Field note – teacher behaviour - explicit creation of 'tut' group as team, uses 'team' term frequently. All student input valued and extended on by teacher to contribute to tutorial task. Teacher sets the tone - creates equal power relationships, reinforcing cooperative shared team expectations. Students follow teachers lead.

Evident in this study were the different approaches and transitions that student and teacher constructed to engage with IBL and utilise the clinical reasoning framework. Some experienced teachers adapted readily to the new learning approach and were able to identify ways to transition students to new investigative approaches drawing on the clinical reasoning framework at key points to promote understanding of the nurse role.

Field note – student identifies abnormal patient data, asks questions about what a nurse could do. Teacher moved students through clinical reasoning prompt questions, focusing on key points like

patient goals and evidence-based interventions aligned with the case to answer the question.

Some inexperienced teachers did not prompt students to use an evidence-based approach to access appropriate web-based resources to answer case questions. Rather the use of layman's terms was observed; for example, “*just Google it; you will find something*”. Alternatively, there was acceptance of sources identified in a quick search (Wikipedia) over use of academic or health discipline-based sources. Inquiry-based approaches should encourage learners' self-direction in seeking, appraising and applying evidence (Hamilton, et., 2012; Aditomo et al., 2013).

Field note – Some teachers did not model use of selective evidence, by not encouraging the use of medication information from the Australian Therapeutic Medication guidelines.

For many teachers the transition to IBL took both tutorial weeks (eight hours), and this seemed not to be linked to teaching experience or style. Some teachers were rigidly focused on keeping students “on task”, frequently leading the tutorial direction. In so doing, teachers drove the learning giving up control for only short periods. As they reframed teaching practice and adopted new learning approaches, they moved to a more facilitated role and allowed student groups more independence while being present to guide. In the early stages of the study students likewise were passive but developed more willingness to actively engage and take on responsibility for their own and group learning through investigation as tutorials unfolded.

Field note: The teacher asks questions and uses prompts to keep discussion going. Students respond to the teacher lead; Teacher brings group back to known concepts; Learning is brought back to the relevant clinical reasoning stage and case to keep students on task.

It is however recognised that while teachers gain many benefits from a greater interaction with students, adjustment to an IBL approach can be a struggle (Spronken-Smith, 2012) and different times and processes of teacher adjustment and reframing were observed over time.

The final analytical construct relates to how both students and teachers engaged with the IBL cases and the approach they each took to develop familiarity with use of the new teaching approach and clinical reasoning scaffolds to ‘think like a nurse’.

### 7.3. ‘Creating and realising new understandings’

A co-construction of learning was evident within small groups. This co-construction was about the development of a partnership which consisted of exchanges of ideas, leading to the establishment of an IBL community of facilitated learning. We found that students in the second tutorial week were consistently observed to be engaging with clinical reasoning through use of the framework and scaffolds. Students began to employ the clinical reasoning vernacular correctly demonstrating they were making meaning by investigating and developing answers in the cases and beginning to ‘think like a nurse’. Behaviour observed likely represented higher order processing (Lapkin et al., 2010; Tang and Sung, 2012) in a nursing context. For example, comparing case data with norms, airing of conclusions and connecting patient data with real world nursing practice actions and outcomes for the case investigated. So, IBL became the method for construction of learning resulting in the observed outcome, of beginning to think like a nurse in addressing the case activities.

Building a successful IBL interaction takes time to stimulate enthusiasm and engagement with activities and this is a key. For most the IBL interaction developed in the following way:

Field note – Slow to start driven by teacher giving cues and direction, requests students to join a group and provides set questions to

review. Once working the momentum picks up and more interaction is observed and sharing in the small group. Requesting one scribe and confirming the need to share with the larger group adds structure and requires a level of commitment from students; Seeking alternative perspectives during the tutorial.

Use of IBL, the clinical reasoning framework, and authentic clinical cases were observed as complimentary in tutorials. Engaging the learner in a meaningful task by its very nature promotes inquiry or discovery (Spronken-Smith, 2012). Interactions however need to be deliberately introduced and built on through the learning engagement to maintain inquiry and connect concepts so learning is continually enabled.

Field note – Teacher highlighting the clinical reasoning framework and bringing responses back to this at key learning points.

Over the observation period IBL group interactions developed, students became more engaged and sought deeper understanding of key aspects.

Field note – Understanding patient data relating to a case, students questioned each other and the teacher about a person's physical signs of illness, one student noted ‘yes so what would I look for to know this’. This student was deliberately seeking to extend their learning.

By week two, student to student collaboration, sharing of options and testing out answers with the small group happened. As the teachers became more confident with the new learning approach, they modelled inquiry-based questioning behaviours and ways for students to be self-directed. This prompted students to use inquiry type questions such as ‘Tell me how that would improve the person's situation?’, highlighting thinking that contributes to the *implement* prompt in the clinical reasoning framework (Fig. 1). Consistent use of key terms representing the clinical reasoning framework and embedded cognitive prompts were applied/used by teachers and students. The uniform use of agreed terms highlights the development of shared group understanding of what nurses think about and do in practice situations. The use of further extending questions and progressing an idea that was identified by others occurred. For example ‘Let's check that in’, students directed to review an electronic resource from the unit website. As momentum and interactivity gathered in the IBL community, positive recognition of contributions was evident by teachers: ‘*Good thinking there, I am impressed, let's think about ...*’ (this teacher was extending the idea and the answer).

Constructing a learning community is a key element of an IBL approach to learning. Recognition of the transitions and valuable contribution of different individuals' perspectives needs to be appreciated when embarking with this teaching approach. In this study inquiry behaviours were observed in the reconstruction of learning and shaped positive exchanges that were observed. Notwithstanding, research identifies greater achievement in academic performance (Summerlee and Murray, 2010) when utilising inquiry-based approaches to support learning.

## 8. Discussion

Introducing a new inquiry-based approach necessitates conscious planning and deliberate behaviour change on behalf of teachers and students. Utilising a clinical reasoning framework and scaffolded approach to IBL required teachers and students to think, reflect and reconstruct their usual approaches. In so doing, once the initial transition from passive and traditional to IBL was made, a positive learning environment was observed. This aligns with the recognition that active approaches to learning, engage students and enhance metacognitive skills (McGarry et al., 2015).

In this study an active and targeted approach to learning to ‘think

like a nurse' through use of clinical reasoning scaffolds embedded in an IBL approach was successful. Teacher/student interactions were observed to change with high levels of student engagement occurring quickly while teacher adjustment to new IBL and facilitative approaches took longer for some. The teacher's role in IBL as one of facilitator of learning is pivotal regardless of the learning scaffolding or framework employed (Walker et al., 2015) and this was clearly seen. In the finding, *Driving and reframing*, some teachers struggled with transition to the facilitative role, concurrently students were observed to be passive in their learning behaviours and challenged to use clinical reasoning prompts in responding to the clinical case questions. Creation of a successful IBL interaction takes time and effort and needs substantial commitment from all individuals (Meijerman et al., 2013; Summerlee and Murray, 2010). The teacher sets the scene and prompts learning behaviours. A feature noted in successful IBL interactions observed in this study was the teacher connecting and interacting in ways that aspired investigation, questioning and interest in learning activities. Taking on IBL requires deliberate teaching behaviour adjustment across all aspects of preparation, construction and execution of teaching. How both teachers and students adapt to their new role and understand their responsibilities within the learning interaction will ultimately determine the success of an IBL approach.

Students today expect flexibility and authentic learning experiences in higher education. The benefits of using IBL approaches has been previously highlighted, particularly in the development of students' higher order thinking (Sproken-Smith, 2012; Walker et al., 2015). Delivery of curricula necessitates structure and support for the learner. Mindful of these considerations, this change to IBL provided students with a flexible and supported interaction that assisted them to engage with authentic clinical cases through scaffolds that supported clinical reasoning. Even though students were attuned to *Opting in and out* of the IBL tutorial learning sessions through online media, the level of engagement with clinical reasoning resources and activities within tutorial was highly evident.

As expected the teacher role was pivotal in creating the climate that enabled IBL approaches to be used. Teachers were initially observed to lead interactions and over time students grew accustomed to new IBL approaches and more active in their learning behaviours. However, employing IBL draws on constant internet searching and connectivity, and consequently is this adding distraction and challenge in the classroom and eroding engagement? What remains unanswered though, is are new generation students more adept at multi-tasking or is their multitasking and constant use of technologies distracting them from the core of utility of IBL, which is the use of questions, inquiry, discussions with other students to develop deep understanding.

## 9. Conclusion

The use of a consistent clinical reasoning framework and scaffolds with IBL case-based activities, facilitated teacher and student interactions in positive ways, and supported implementation of new pedagogy. The findings inform how use of IBL supports teaching clinical reasoning and informs implementing an IBL approach. This study was not without limitations as it relates to the social construction of teaching and learning of individuals from a cohort in one subject at one university. The presence of the researchers during overt observations may have influenced the way participants interacted in tutorial groups and may have led to some change in how the class functioned. Action cycle three will evaluate student perception of learning. Teaching a large cohort of students to 'think like a nurse' using consistent learning approaches, scaffolds and a framework, overcame the challenges of embedding a more active approach to learning.

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