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Abstract

Clinical education capacity is a priority for health professional education providers across the globe. The disruption to clinical education as a result of COVID-19 has required the planning and uptake of flexible and innovative approaches to sustain clinical placements. Project-based learning provides opportunities for students to work collaboratively with their clinical placement hosts or 'host organisation' to undertake projects that support student learning while benefiting a range of organisation stakeholders. This paper outlines the role of project-based learning in the current context of clinical education and how this can be used to supplement clinical education activities through authentic student-centred learning. This paper also provides an overview of projects that may be considered for use by education providers, host organisations and their clinical educators.

I INTRODUCTION

"While many will remember the COVID-19 pandemic as a source of disruption, it is likely that it will also be viewed as a catalyst for the transformation of health education that had been brewing for the past decade" (Lucey & Johnston, 2020, p. 1033). This recent quote captures the sentiment of many education providers and clinical education host organisations as we move into a potential 'post-COVID' era, and thus reflect on changes, both forced and optional, and consider ways of moving forward with sustainable innovation.

One area of concern that has been exacerbated by COVID-19 is clinical education. For many students, the most disruptive aspect of COVID-19 is the impact on their ability to successfully fulfil entry-level requirements of their profession through completion of clinical education. This extent of disruption has ranged from reduced patient contact during placements, students being precluded from some service delivery or clinical specialities, a decline in organisations willing to host students through to some host organisations completely suspending existing placements. Such disruption has inadvertently drawn attention to the consideration of alternative curricula to support student learning during clinical education and how students can continue to contribute to service delivery or other meaningful outcomes of their host organisations. Importantly, these innovations may help existing host organisations to continue student placements in a way that is mutually beneficial where patient loss, staff attrition or changes to services have occurred following regulatory or service-use implications resulting from COVID-19. As we continue to address the numerous challenges of meeting clinical education targets, this is an opportune time to reflect on the value of recent and ongoing innovations to clinical education that can act to support students and their host organisations into the future. Despite the impact of COVID-19, Australian health professions will continue to grapple with the increasing tension between higher education initiatives to expand clinical education capacity, and the ability of the health system to provide training for increasing numbers of health professional students. Creating innovative ways to support placements has the potential to facilitate smaller, part-time or emerging organisations to begin, or continue to, host health professional students where traditional barriers may have precluded their participation.

Project-based learning (PjBL) is one such innovation that is increasingly adopted to supplement work integrated learning experiences within higher education, including clinical education. PjBL is a form of situated learning within a constructivist paradigm where learning is constructed through engaging in real and meaningful problems (Hmelo-Silver, 2004). According to one of the most popular definitions, project-based learning is a pedagogical approach that "engages students in learning knowledge and skills through an extended inquiry process structured around complex, authentic questions and carefully designed products and tasks" (Markham et al., 2003, pp. 4). Projects allow students to investigate questions, generate hypotheses, explore ideas, and propose solutions to meaningful problems that are highly relevant to their setting. Clinical education is an ideal setting for PjBL curricula as projects are considered to be relatively complex tasks that require problem solving where the student can lead collaborative decision making and evaluation to produce tangible solutions that can benefit any or all stakeholders of the host organisation. The ability of students to work autonomously or in small groups also allows PjBL to be adapted to a range of clinical settings. Projects may facilitate students to more fully understand how their clinical education host organisation fits within the wider healthcare and industry context and may provide opportunities to more thoroughly understand the needs of stakeholders, in particular, service users and staff. Research investigating the outcomes of PjBL to date has demonstrated improvements in student problem-

solving abilities, academic performance, learning strategies and product quality (Almulla, 2020; Guo et al., 2020).

II WHAT ARE THE ESSENTIAL FEATURES OF EFFECTIVE PjBL?

1. The student works collaboratively with the host organisation or clinical educator to define a mutually agreeable real-world **challenging problem or question** that needs to be solved. An engaging problem makes learning more meaningful for the student and the host organisation. Ideal 'problems' should be challenging yet feasible for students to investigate and worthwhile and important from the perspective of the student and their host organisation (Krajcik et al., 2002). Importantly, addressing the challenging problem or question should require collaborative input from others central to the host organisation rather than simply 'looking up' information.
2. Students are provided with adequate time, space, and relevant resources for **sustained inquiry** into the challenging problem or question. Ideally this will require students to incorporate different information sources through both traditional research approaches and more real-world inquiry directly with experts, service providers or service users. This may include access to relevant industry stakeholders, staff, patients, or clients of the host organisation. As students pursue their inquiry into the challenging problem or question, they develop meaningful understandings of key scientific concepts, principles, and practices.
3. Students focus on **authenticity** of problem solving to consider and explore meaningful options. This should be a collaborative process with relevant stakeholders of the host organisation. Proposed solutions should include realistic components that go beyond a hypothetical exercise and connect the project to the real world (Thomas, 2000).
4. Students address the challenging problem or question through a **tangible solution**, resource, product, or artifact that has been mutually agreed upon in the initial stages of the project but may evolve as the project continues. By focusing on and creating a solution, resource or product, students can make what they have learned tangible and thus, when shared publicly, discussible and of value. This extends the experience and benefits of the project beyond an exchange between the student and educator to something that has a wider impact, thus extending the social dimension of learning (Larmer, 2020).
5. The PjBL approach is **cyclical** in nature where students create knowledge, meaning and tangible solutions through continuous consultation, reflection, feedback, and sharing (Blumenfeld et al., 1991).

Of these key features of PjBL, the development of a tangible solution, is what differentiates PjBL from other student-centred curricula. This focuses the pedagogy on working collaboratively to explore, design and evaluate solutions to real-word problems with real stakeholders. Ideally, students should be given an opportunity to present and explain their solution, resource, or product. Importantly, in a clinical education setting, this allows the host organisation and its relevant stakeholders to be involved in the construction of knowledge and subsequent solutions which provides new and varied mechanisms for both facilitation and feedback (Guo et al, 2020).

III HOW CAN PjBL BE IMPLEMENTED WITHIN CLINICAL EDUCATION SETTINGS?

Projects should be developed in partnership between the student/s and host organisation. Students may lead all or parts of the design, decision-making, problem-finding, problem-solving, discovery, and solution building processes, but this must reflect a strong collaborative focus.

The following table outlines potential PjBL projects and associated activities within clinical education settings.

Table 1
Project types, activities, and benefits to student/s.

Project Type	Activity	Student learning related to clinical education outcomes
Service delivery evaluation projects	Exploration and evaluation of existing services within the host organisation from the perspective of key stakeholders. This may include quality assurance activities where investigating the perspective of stakeholders are planned and completed using relevant reporting tools. This may include cost: benefit analyses or other systematic approaches to service evaluation.	Students learn about existing services available, their value and outcomes within the organisation. Students learn how to plan and evaluate service delivery from the perspective of service providers (the host organisation) and users.
Service delivery innovation projects	Exploration of potential new services or updates or innovations to existing services offered by the host organisation. These may include innovations including patient support services, new healthcare services, programs, or marketing strategies.	Students investigate existing and potential service opportunities within or parallel to the host organisation's services. Students gain experience in approaches to service development that can be used throughout their careers to support strategic decision making. This may occur when opportunities arise to develop a service, lead a team, or contribute to projects.
Patient resource projects	Development of patient take-home educational resources to support in-person health services. Development and evaluation of online resources including patient educational resources, advertising, or marketing material.	Students learn about existing resources online and may learn about the management of clinical specialities specific to the host organisation. Students learn how to tailor information for online platforms. Students learn to consider health literacy in the development of effective resources.
Resource development projects	Development of staff in-service activities, presentations, or evidence-based practice initiatives. Development of clinical case studies for staff professional learning and development. Development of clinical guideline or evidence-based practice repositories for the organisation using relevant taxonomies. Development of patient management resources or development of other products including videos to support patient care.	Students learn how to 'democratise' data and research to allow access to others within the host organisation. Students are required to synthesise large amounts of information and resources into user-friendly and accessible formats. Students are required to think critically about the relevance of resources and can consider evaluating the usefulness of existing resources. Students learn about the importance of continuing professional development and ways in which this can be delivered.

IV CONSIDERATIONS FOR ASSESSMENT

Assessment of the contribution of PjBL outcomes towards the students' overall assessment during clinical placements may be a significant limiting factor for those considering adopting PjBL. Determining what knowledge, skills and behaviours should be assessed as part of the PjBL such as collaboration, problem solving and critical thinking, is important to ensure that activities meet the needs of students throughout the project and at completion. Clear expectations of outcomes and effective feedback is required throughout the project, which can be facilitated by the clinical educator in collaboration with the education provider. Where standardised formative clinical placement assessments may preclude contribution of the project to final assessment, clinical educators and host organisations may benefit from support from the education provider in determining how PjBL processes and outcomes may contribute to the student's overall formative assessment. Setting clear expectations and success criteria in collaboration with students prior to undertaking the project will allow assessment to be more effective for student learning and success. For more information on assessment in PjBL, the following resource is of value (New South Wales Government, 2020).

V CHALLENGES

It is important to consider some of the challenges of adopting PjBL within clinical education settings. Assessment is a key challenge, as outlined earlier, and formative assessment, as often used in clinical education settings, requires that the learner receives and engages in effective feedback and that clinical educators are prepared to select and apply effective mechanisms for feedback (Black & William, 1998). Successful PjBL also requires significant co-construction of planning and outcomes between the educator, student/s and other stakeholders. Planning, collecting data, refining resources and presentations of projects and learning can take substantial time that needs to be considered. Clinical educators and the education provider must also weigh up time use on placement. Where health professional students require substantial time engaged in clinical service delivery, the role of PjBL must be weighed up against other critical student learning activities and outcomes.

VI SUMMARY

In the current clinical education climate, which has been exacerbated with the advent of COVID-19, the possible inability of health professional students to graduate with sufficient clinical education experiences may have a marked impact on the future workforce. This may also have a flow on effect in 2021 and beyond where clinical education capacity may not extend to more than one cohort. Building and sustaining capacity in industry based clinical education where possible through innovative initiatives including PjBL may act to minimise these impacts on current and future cohorts and providers. Finally, PjBL provides opportunities for student-led initiatives and outcomes to be visible to existing and potential host organisations and industry. Lastly, making student work public and valuable is an effective way to communicate to host organisations, stakeholders, and the wider industry about the valuable contribution of students.

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