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How does engaging in authentic research at undergraduate level contribute to student well-being?

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ABSTRACT




In the context of rapidly growing numbers of university students reporting that they have experienced mental health problems, this paper argues that doing research as an undergraduate can contribute to student well-being. Although the benefits of undergraduate research are well documented, underlying reasons for its efficacy on positive student outcomes require investigation. This paper uses Self-Determination theory, which has empirically shown that fulfilling one's need for autonomy, competence, and relatedness fosters well-being. Using authenticity as a conceptual lens to understand undergraduate research experiences, and a novel connection to Self-Determination theory, the theoretical proposition that authenticity within undergraduate research contributes to well-being is elaborated. The paper suggests that authenticity within undergraduate research experiences offers a way to stimulate well-being among our students, which hinges on effective curriculum design and mentoring. Two case studies, drawn from Medicine and Geography, explore the way in which curriculum design coupled with mentoring pedagogy can enhance authenticity in research, student motivation, and, therefore, well-being. The paper reveals how authentic research-based learning can form an entitlement for all students through an embedded curriculum-based approach. The paper advocates for research-based learning to begin early in the undergraduate curriculum, in order to establish a sense of belonging for students and healthy learner-centred pedagogy. In addition to the framework for authenticity adopted, this paper reveals the importance of attention to the quality of learning spaces (novelty, professionalism, inclusivity) and the practice-based elements of mentoring for effective relationships between learners and teachers to ensure the well-being of all involved.

KEYWORDS

Motivation; authenticity; well-being; autonomy; research-based learning

Introduction: student well-being – a growing concern

Mental health issues affect a large proportion of the general population over the course of their life. The 'Health Survey for England 2014' showed 26% of all adults reported having ever been diagnosed with at least one mental illness, and a further 18% reported having experienced a mental illness without a formal diagnosis (Guthrie et al. 2017, 30). Higher Education has seen rapidly growing numbers of university students reporting that they have experienced mental health problems

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(Guthrie et al. 2017) in what has been described as a ‘campus mental health crisis’ (Schwartz and Kay 2009). In 2015/2016, over 15,000 first-year students in UK universities reported that they had a mental health problem, compared to approximately 3,000 in 2006 (IPPR 2017). Lipson et al. (2016) revealed significant disciplinary differences in well-being statistics across 48,667 university and college undergraduates in the USA. Undergraduate prevalence rates (at least one mental health problem) ranged from 28% in Public Health, rising to 45% in Art and Design. Treatment rates also varied widely, from the lowest at 25% in Engineering to the highest rate of 50% in Social Work. In medical students specifically, a systematic review and meta-analysis of 183 studies in over 40 countries showed a prevalence of depressive symptoms of 27.2% (Rotenstein et al. 2016). Regardless of discipline, marginalised students are at the greatest risk of low levels of well-being, with disabled students more than any other group being at the highest risk (Oman 2017). Feelings of belonging and self-efficacy are essential for well-being, and student attainment can translate into feelings of belonging or marginalisation. Persistent attainment gaps across higher education (Tatlow 2015) highlight underserved populations, and challenge educational providers to offer inclusive pedagogic spaces for learning.

When students were asked to explore well-being solutions in focus groups, these included opportunities for mentoring and networking; finding social spaces; and developing nurturing social environments, and significantly students wanted to have a voice in developing these opportunities (Oman 2017). A research-based learning experience could provide these opportunities, as undergraduate research confers multiple benefits, including opportunities to develop close working relationships with faculty members (Thiry and Laursen 2011), to identify as a researcher (Thiry, Laursen, and Hunter 2011), as well as access to inclusive, social learning spaces (Shanahan et al. 2015). Therefore, the purpose of this paper is to explore the way in which student capabilities for well-being can be enhanced through engaging in research. First, the beneficial outcomes of undergraduate research are considered and focussed through particular attention to authenticity in research. Thereafter, Self-Determination Theory, are used to consider the underlying connection between authentic undergraduate research experiences and fostering well-being. Exemplars from medical and geographical education are offered to tease out broader curriculum design principles and effective pedagogic practice to maximise opportunities for student well-being through research-based learning.

How does doing undergraduate research benefit students?

An undergraduate research experience has multiple beneficial outcomes including a sense of belonging and perceived personal competence (Lopatto 2008); understanding, confidence and awareness (Russell, Hancock, and McCulloch 2007). The benefits, however, are specific to different groups of students (e.g. for minority students, see Boyd and Wesemann 2009; Jones, Barlow, and Villarejo 2010; Kendricks, Nedunuri, and Arment 2013). Undergraduate research has been shown to offer particular gains for students from underserved populations (e.g. Brownell and Swaner 2010; Finley and McNair 2013), with mentoring accounting for the leveraging effect of research as a transformative experience for students. Through large-scale empirical research in American Higher Education Kuh and O’Donnell (2013) have distilled elements of ‘high impact’ practices that translate into undergraduate students achieving successful outcomes. Mentored research is one such high-impact practice as it can promote feelings of mastery and efficacy among students. Understanding what makes for effective mentoring has therefore become a focus of recent research (Shanahan et al. 2015; Vandermaas-Peeler, Miller, and Moore 2018; Walkington et al. 2020). Thiry and Laursen (2011) highlighted three forms of support that undergraduate research mentors offer to students, all crucial for student well-being: support for intellectual development, for professional socialisation, and for personal and emotional development. According to Chang and Ramnanan (2015) undergraduate research experiences not only benefit the development of research skills but interpersonal skills as well. Their systematic review revealed that interaction with faculty is an important motivating factor and a paucity of mentors or faculty guidance was labelled as demotivating. In line with

this, Moller, Shoshan, and Heikkila (2015) identified 'independence and collaboration' as one category of learning outcomes related to personal development.

A framing of authenticity in research-based learning

In the context of research-based learning (hereafter RBL) Wald and Harland (2017) proposed a theoretically informed and practice-oriented framework for authenticity stating that 'the authentic model of teaching through research should promote students' *sense of ownership over the research, which is achieved by entrusting them with the responsibility for the work and care for their peers, while teachers provide expert support*' (758). This definition hints at links between RBL and specific well-being benefits which are described in more detail in the next section. Wald and Harland (2017) usefully outline three ways of understanding authenticity. In undergraduate research contexts, authenticity is interpreted as '*relating to the real world*' (3) such that students experience how knowledge is produced and utilised in real life, preparing them for future professional practice. The second way to understand authenticity in undergraduate research experiences, is *the existential authentic self* (4). Developing a sense of self and self-identity through ownership of research and being true to one's self, translates into becoming an independent learner. The third explanation of authenticity relates to fostering personal meaning ('*a degree of meaning*', 7). Within the learning experience, this is best accomplished by engaging students in their own quest for knowledge. What is regarded as being meaningful depends on what students, personally, deem important or valuable. This sense of personal meaning can also be created between and shared with others.

This paper now explores how concerns about student well-being might be addressed through exploring a deeper understanding of the motivations to learn developed through authentic research experiences in the way that they contribute to the psychological needs of students. Wald and Harland's authenticity framing is now linked to Self-Determination Theory for deeper insights into the motivational factors contributing to student well-being, in the context of undergraduate research experiences.

Self-determination theory

Self-Determination Theory (hereafter SDT), developed by Ryan and Deci, is an empirically based theory of human behaviour and personality development. SDT addresses social conditions that aid or obstruct human flourishing, examining how inherent human capabilities for engagement and well-being can either be enhanced or undermined.

Contrary to other motivational theories, SDT states that the presence of motivation (i.e. quantity of motivation) is not sufficient in order to support human flourishing and feelings of well-being. Rather, SDT focuses on the *quality* of motivation, suggesting that some forms of motivation are completely volitional, while other forms are entirely external. A central distinction in SDT is intrinsic versus extrinsic motivation. Intrinsic motivation can be defined as pursuing an activity out of pure interest, benefiting personal feelings of enjoyment. Extrinsic motivation entails pursuing an activity for externally located consequences, like an external reward or social approval. According to SDT, intrinsic motivation can foster academic performance, deep learning, and well-being (Ryan and Deci 2017).

SDT is underpinned by the idea that satisfaction of three basic psychological needs is imperative in order to elicit and sustain intrinsic motivation, which in turn leads to feelings of well-being. First is the need for autonomy, the need to self-regulate experiences and actions. Autonomy, therefore, relates to feeling volitional and self-endorsed, compatible with one's own authentic interests and values. Second is the need for competence, for feelings of mastery and efficacy. Third is the need for relatedness, feeling socially connected with and cared for by others.

Robust relationships between the satisfaction of the three basic needs and wellness outcomes (such as subjective well-being and lower symptoms of psychopathology) have been identified

across diverse international settings, for example, in Belgium, China, USA and Peru (Chen et al. 2015); and amongst College students in the USA, Australia, Mexico, Venezuela, the Philippines, Malaysia, China, Japan and Korea (Church et al. 2013; Jang et al. 2009; Sheldon et al. 2004, 2009). Therefore, when implementing authentic undergraduate research (based on authenticity as conceived by Wald and Harland 2017), it is possible to connect this to the underpinning psychological needs which undergraduate research can satisfy: promoting students' sense of ownership and entrusting them with responsibilities in research satisfies their need for *autonomy*; responsibility to care for peers strengthens feelings of social connectedness and of being significant contributors within a research community, satisfying the need for *relatedness*. Lastly, teachers providing expert support through undergraduate research mentoring helps to satisfy the need for *competence*. In order to flourish and promote student well-being, all three psychological needs must be satisfied (Ryan and Deci 2000, 2017) and potential need frustrations must be addressed, such as inadequate collaboration, a lack of autonomy or a poor atmosphere in a research group, a perceived lack of research relevance (Ommering et al. 2020b).

Implications for the curriculum and for mentoring practice

Feelings of autonomy, relatedness and competence, rather than measures of actual capability are crucial in cultivating intrinsic motivation (Ryan and Deci 2017). It is, therefore, feasible to start early in the curriculum to give students tasks which build these feelings, without the pressure to complete an entire research project independently. In first-year courses, Levy and Petruilis (2012) noted that when students were offered opportunities to frame lines of inquiry and build knowledge themselves, with appropriate faculty support, they found this empowering for their intellectual and personal development. The scaffolding offered by research mentoring helps to provide structured experiences which satisfy the three psychological needs. Mentored undergraduate research is now used to exemplify how intrinsic motivation to learn can evolve from autonomy, competence, and relatedness.

Feelings of autonomy can be promoted by giving students the freedom to make significant choices within their research project, offering chances to self-regulate the research experience, enhancing compatibility with authentic interests and values. Furthermore, students can be stimulated to take a leading role in carrying out research, adding to feelings of volition and self-endorsement (Ommering et al. 2020a). Consequently, a valuable avenue for enhancing student well-being emerges where this can be embedded in the curriculum for every student. At the undergraduate level, many students are encountering research experiences for the first time. This implies that support for competence should also complement support for autonomy. Specifically, mentoring is of great value for stimulating students to feel effective in navigating the difficult research landscape. While cooperating with students, mentors could create the right environment by setting achievable targets and formulating clear research goals (Walkington et al. 2020). Furthermore, while the student conducts research autonomously, a mentor can closely monitor progress and offer support when needed. Hereby, the mentor provides social guidance as well, contributing to students' feelings of being cared for by others, one part of the need for relatedness. In order to fully establish relatedness, students need to feel that they are significant members of the research endeavour, so a sense of community can be established in which the students are involved (Shanahan et al. 2015; Walkington et al. 2020).

Case studies

The two vignettes below offer insights into how the three aspects of authenticity provided by Wald and Harland (2017) can be embedded within course-based research experiences. Both vignettes provide accounts of embedded experiences for *all* students early in the undergraduate curriculum and demonstrate the importance of ownership by the student and their own sense of responsibility

for research and its dissemination, which provide a platform for the feelings that contribute to student well-being.

Vignette 1: *Leiden University Medical Center, Individual clinical research arising from patient bedside experiences.*

Connecting research with clinical practice is pivotal to involve scientific knowledge in clinical decision-making and make advancements within medicine (Dekker 2011). Subsequently, 'scholar' is one of the roles a medical graduate should master (Richardson et al. 2014). Leiden University Medical Center implemented a mandatory research course for all first-year medical students to conduct clinical research. Every student individually conducted a small research project, being involved in gathering and processing patient data (i.e. each student collects detailed data from three patients, combining their data into a large shared dataset), formulating an individual research question, analysing data, writing a research report, and presenting their research to a critical audience in a simulated conference setting. As students are engaged in every step of the research process and gather data from real patients, it mirrors how clinician-scientists perform research in professional practice. Students are mentored by a researcher (e.g. clinician, academic, graduate student) but are free to formulate their own research question and have a leading role in the implementation of their research. Hence, the experience aligns with authentic interests, and feelings of responsibility and ownership are supported. Furthermore, by offering students the possibility to formulate their research question 'at the bedside of the patient' (i.e. based on personal experiences within an internship in a nursing home), the research project is deemed personally meaningful.

Vignette 2: *Oxford Brookes University Geography, Peer-mentored International research-based learning in the field.*

Fieldwork is a signature pedagogy for the discipline of geography (Shulman 2005) and field-based research forms an important element of a geography degree (QAA 2019). In the three-year undergraduate honours degree in Geography at Oxford Brookes University (UK) students undertake a group research investigation that runs throughout the second year. Students work as a small team to design their research in semester 1, collect primary data on residential fieldwork in the inter-semester break, then return in semester 2 to analyse data and complete individual written reports. Students are supported through all phases of the research cycle by a year 3 student peer-mentor and a faculty mentor. The investigation not only takes place in the real world but also mirrors being an academic or professional geographer, including the option to publish the results in a journal article for a public audience. Students' feelings of ownership are stimulated as they take part in personally meaningful research, understanding their own opinions and values as well as eliciting research findings.

The vignettes highlight how two disciplines have embedded experience of the full research process for all students on a programme, combining personally meaningful learning with a strong degree of autonomy. The examples showed how there was the potential for student research to 'make a difference' in multiple authentic ways, e.g. to wider society, or within the scientific project, both of which can promote feelings of care among students, as well as benefit personal intellectual growth. However, simply instructing students to go and do real-world research is insufficient to ensure successful outcomes. Students could easily experience need frustration (Ryan and Deci 2017), such as feelings of being overwhelmed or isolated if curriculum architecture and mentor support are not in place to ensure positive learning experiences for everyone. High-quality mentoring cultivates intrinsic motivation in students and thus can enhance well-being. Next, this paper outlines curriculum design features and salient practices for inclusive and high-quality mentored undergraduate research experiences. Still framed on Wald and Harland's interpretation of authenticity, it draws out the way in which research-based learning can be provided to all students with the benefits of enhancing motivation and a sense of well-being.

The design and practice of authentic research-based learning

Providing all students with opportunities to engage in research-based learning and benefit from a high-impact practice is best embedded as course-based research experiences with the potential to enhance well-being through increasing motivation and attainment for all students. Ommering et al. (2020a) proposed 12 tips to design a research course embedded within large-scale education, while still allowing every student to conduct research individually. Shanahan et al. (2015) identified ten salient practices (SP) for effective research mentoring. This section explores the way in which curriculum design (tips 1–12) together with a mentoring pedagogy (SP1–10) can enhance authenticity, motivation and, therefore well-being in research-based learning.

Real-world research

Learning-by-doing is a key objective when offering an experiential opportunity within the core curriculum. Such an active learning approach contributes to curiosity, which is a prerequisite for motivation (Amgad et al. 2015; Willison and O'Regan 2007). Curiosity is especially provoked within the context of real-world problems, elucidating emotion. Thus, in order to trigger curiosity, raise motivation, and ultimately promote student well-being, learning should mirror the real world (Merrill 2002). A successful research-based learning approach within the curriculum should use relevant real-world examples to stimulate curiosity (tip 4) and engage students in every stage of the scientific research process (tip 1). In this way, students become acquainted with how actual scientists do their work and a shift from research consumer to research producer can be established. Here, the mentor plays an important role. Teaching the technical skills, methods, and techniques of conducting research in the discipline (SP3) is often seen as the primary responsibility of a research mentor, particularly relating to ethical and professional practice, but it also affords an opportunity to ensure that research skills match students' aspirations and are personalised as far as possible. This enables students to feel a connection to their discipline (relatedness) through research that interests them and is of wider relevance as a means to contribute to their well-being. Creating opportunities for peers and near-peers to mentor each other (SP9) can broaden scholarly opportunities so that students not only see the relevance of their own real-world research but also learn how their discipline is created through the research endeavours of others, and they can contribute in mutually supportive ways. As dissemination of scientific work is the last step within the research process, students should be encouraged and supported to share findings (SP10) by writing a professional academic piece (tip 10), presenting orally (tip 11), and receiving feedback (tip 12) from their mentor. This practice also reflected in Kuh and O'Donnell's (2013) 'Public demonstration of Competence' element, offers students opportunities to publicly demonstrate new knowledge and skills, which fosters well-being through need-satisfaction and motivation.

Existential authenticity through research

For research-based learning to be authentic, students need to *become* researchers (Thiry, Laursen, and Hunter 2011). Emerging researcher-identities should be fostered and need to align with a student's own values. This relates to the definition of authenticity by Ryan and Deci (2017), who emphasised that one's behaviour needs to be endorsed by the self. An embedded research course should therefore foster the existential authentic self, especially if the aim is to enhance motivation and, subsequently, well-being. By providing research experiences in large group sessions (tip 6), possibilities are created to reach all groups of students, offering them a solid research-related foundation. Subsequently, smaller group sessions can be used to help students develop more in-depth research knowledge and immerse themselves in research, which contributes to developing a researcher identity and feelings about becoming a researcher. Furthermore, smaller group sessions allow for hands-on one-to-one mentoring (SP6). Mentors are often researchers themselves and can become

authentic and inspiring role models for students. Using inspiring researchers as teachers of small group sessions (tip 8) enhances positive perceptions of, and motivation for, research among students. Becoming a researcher can be an uncomfortable existential leap from being 'just a student' (Hill and Walkington 2016) and is strongly associated with identity development and therefore well-being status. Students who identify as researchers and even 'mini professionals' as a result of engaging in research have been through a challenging process, yet have proven their resilience and developed feelings of self-efficacy. One of the most fundamental roles of an academic research mentor, therefore, is balancing high expectations and an appropriate sense of challenge against a safety net of support (Walkington et al. 2020) in line with students' needs for competence and relatedness. As Ryan and Deci stated (2017, 11) competence 'waned in contexts in which challenges are too difficult, negative feedback is pervasive, or feelings of mastery and effectiveness are diminished or undermined by interpersonal factors such as person-focused criticism and social comparisons'. Achieving the balance between giving students the freedom and taking too much control of the research is something that takes time to develop and involves a good knowledge of, and interest in, individual undergraduates (SP4) who are novice researchers. While it is important to stretch students by providing a sense of challenge, it is also important to provide a scaffolded support structure (SP4, tip 7) so that students can build their confidence against an authentic sense of potential for failure in their research project. Academic mentors, therefore, need to respond to students' varying needs and abilities (SP1) throughout the research process as these may differ between individuals and over time. Setting clear expectations (SP2) is important, ensuring that these are progressively raised is something that can only come with hands-on mentoring (SP6). According to Wald and Harland's framework, a pivotal perspective regarding the existential authentic self is that mentors and students learn in dialogue, sharing responsibilities for mutual growth. Existential authenticity in research can therefore be supported through: professional socialisation support; personal and emotional support; and intellectual support (Thiry and Laursen 2011).

Personal meaning

In order to perceive an activity as authentic, it needs to have personal meaning or relevance. A requirement to promote deep learning is that students should experience relevance within a real-world environment (Merrill 2002). Stimulating students to collect real-world data to answer relevant research questions (tip 2) explicitly connects research to practice, which is related to increased feelings of meaning and motivation. Furthermore, students should be given autonomy in conducting their own research project (tip 5). This could be established by granting students responsibilities regarding the implementation of the research project, mentoring students so they can take progressively greater ownership as the project proceeds (SP7). In this way, students lead their own quest for knowledge, a significant role in perceptions of meaningful activity and developing a researcher-identity. The professionalisation of this identity can be enhanced through networking with others, e.g. other faculty members or faculty beyond the university. Mentoring students in the ways they act in professional spaces can be a means of introducing them further to the norms of their discipline (SP8). Moreover, personal meaning is also created between and shared with others, reflecting the importance of feelings of belonging and community (i.e. students' need for relatedness). In course-based undergraduate research, distributing data collection across all students (tip 3) contributes to feelings of social interdependence among students (Johnson 2003). A sense of ownership also sustains student engagement with their studies, discipline, and even institution. Students who have presented their research in multidisciplinary fora have reported a sense of well-being from connecting to those beyond their discipline akin to 'removing blinkers' (Walkington, Hill and Kneale 2016). The sense of being part of a community that can contribute to knowledge creation is a powerful means to create well-being as it relates to connectedness, altruism, a healthy work ethic, and clear sense of purpose. In disciplines where research is team-based, as is often the case early in degree programmes, building a sense of community among the research

team (SP5) is highly effective, although perhaps one of the most difficult practices to enact in some disciplines, hence the need to create fora for sharing, such as conferences and dedicated student journals. Socially connecting students could be strengthened by implementing peer discussion within the research course (tip 9). Moreover, by giving students possibilities to guide each other and stimulate peer discussion, deep learning is enhanced (Shanahan et al. 2015). In this way, a platform is created in which students help each other, which stimulates the need for relatedness. Lastly, by seeing a peer or near-peer succeed in the same complex task, students' self-efficacy beliefs will be enhanced as well, which is related to higher levels of motivation and well-being (Bandura 1997). Taken together, these strategies help to foster authenticity by increasing the degree of meaning, while also stimulating feelings of relatedness to contribute to students' feelings of well-being.

Discussion

Active engagement in research can move students away from adopting a research 'consumer' identity, with higher student-as-consumer orientation at the undergraduate level being associated with lower academic performance (Bunce, Baird, and Jones 2017). Instead, a student-as-producer identity, where social learning takes place, can be transformatory (Neary 2010), giving students agency and voice. Together the students experience research as it is undertaken by professionals in their discipline, combining a curriculum requirement with an authentic question and output. Both vignettes offered a complete research cycle within a module, ending in authentic research dissemination and outlined authentic research-based learning early in the undergraduate experience. The research environment is fully collaborative, every individual's data matters to the wider project, and this is important in ensuring inclusivity and avoiding the sense of isolation that individual study could create. The paper has shown how good curriculum design is essential but, in addition, effective mentoring practices ensure that all students can achieve positive experiences of the curriculum in a personalised support structure that safeguards well-being as students engage with research.

Striving towards a student transition from research consumer to research producer not only makes an undergraduate research experience authentic, it also contributes to need-satisfaction and, ultimately well-being. The psychological needs of students offer insights into how authenticity can be fostered in the curriculum and how to strengthen inclusive and nurturing environments in higher education in which students can develop their sense of personal fulfilment. Feelings of belonging and self-efficacy can be developed and reinforced in spaces that are continually enriched through authentic participation.

The paper has demonstrated how authenticity within research-based learning can be embedded in the curriculum and made available to all students, and this hinges on developing well-being through the emphasis on learning spaces in which close working relationships can evolve.

Learning spaces where learners can develop mature working relationships, embrace and value diversity, and give consideration to multiple perspectives (see Borderland spaces, e.g. Hill, Walkington and Kneale 2019) have been linked to the development of self-authorship (Baxter Magolda 2004). These spaces are conceived of as unfamiliar physical or metaphorical territories whose novelty and ambiguity offer a challenge, which can seem daunting to students and faculty (Hill, Walkington and Kneale 2019). For undergraduate researchers, this novelty may include the field of data collection, data analysis (e.g. statistics), academic conferences, online journals, or even just doing research or being mentored, where these are unfamiliar pedagogic approaches (albeit sometimes delivered in familiar spaces). According to Bandura's (1997) Social Cognitive Theory, these daunting and ambiguous activities pre-eminently accommodate opportunities to increase self-efficacy beliefs through fostering success experiences, in turn contributing to feelings of well-being. A characteristic of these spaces is that they are often dialogic in nature, for example, learning spaces dedicated to discussing research with others (faculty and other student researchers) include undergraduate research conferences (Walkington, Hill and Kneale 2016), as well as spaces for virtual

dialogue, e.g. online journals (Walkington 2012). Engaging in dialogue with other student researchers can lead to a reciprocal and elucidatory student-led pedagogy (Walkington, Hill and Kneale 2016). Such borderland learning spaces can be transformatory, with students experiencing a liminal state which can result in an identity change from student to researcher. In multidisciplinary undergraduate conferences, students reported a breaking down of the isolation they felt in their discipline, instead of feeling part of an institutional community (Pavliakou and Walkington 2018). An undergraduate research experience specifically offers possibilities to develop and support close working relationships for students with both faculty members as well as peer-researchers. These close working relationships contribute to feelings of being part of a community.

In adopting an authenticity framework, this paper has argued for a research-based learning experience for all students in an environment supported by experts to develop ownership, responsibility and care for peers which contributes to student well-being. An important distinction exists between students carrying out research in a group or social setting and the ingredients needed for authentic co-production. In the latter case, learning by doing research is coupled with reciprocal learning through dialogue with other researchers (peer researchers, near-peer researchers or in research mentoring relationships). In this way, Habermas' 'ideal speech act' (Boud, Cohen, and Sampson 2002), where the power differential of teacher and learner is replaced with communication as co-producers, links to the importance of students learning together and from each other in supportive and inclusive learning spaces. The learning spaces, whether real, virtual or imagined are also important from a well-being perspective, as they can help to avoid learner isolation, give room to open up dialogue and provide opportunities for students to be truly active in research, guided by curiosity, connecting to others around them and thereby to developing their skills in lifelong learning. This research suggests that in addition to the existing framework for authenticity, further attention should be paid to the quality of learning spaces (novelty, professionalism, inclusivity) and the practice-based elements for effective relationships between learners and teachers, such as mentoring to ensure the well-being of all involved.

Disclosure statement

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