# Embedding Universal Design into Intensive Learning Experiences

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## Abstract

This paper reports on the findings of a study investigating a new intensive instructional design approach called the "Cheese Sandwich". The Cheese Sandwich was used to create the "Effective Learning and Teaching" (EL&T) course at a post 1992 British University. EL&T is an intensive 3-day course for staff new to HE teaching, aligning with the institutional commitment to Universal Design for Learning (UDL). The aim of the study was to uncover the extent to which participants in EL&T encountered an intensive learning experience reflecting the UDL principles. A second aim was to assess the importance of those UDL principles in effectively supporting participant learning. Participants were 30 university staff enrolled in EL&T. The extent to which participants encountered an intensive learning experience reflecting UDL principles, and the extent to which they perceived those principles as effectively supporting their learning was assessed *via* the UDL perception survey. The survey consists of two main dimensions; 1) the extent to which respondents experienced learning and teaching practices reflective of UDL on their course and; 2) the extent to which respondents perceive those practices to be effective in supporting their learning. Each dimension consists of 36 items adapted from the UDL "checkpoints". Responses to each dimension are made on a five-point Likert scale (1 – 5). Of the 36 items in Dimension 2, 29 received a mean score $\geq 3.5$, meaning they were considered "very" or "extremely" effective for learning. For each of the 29 items considered "very" or "extremely" effective, participant perception was that they occurred "often" or "always" in EL&T. The Cheese Sandwich appears to be an effective intensive instructional design tool, enabling the embedding of UDL into intensive learning experiences, with demonstrable perceived benefits for learning.

**Keywords:** Universal Design for Learning (UDL), Cheese Sandwich, Intensive learning

## Introduction

The UK Higher Education (UKHE) sector has grown considerably over the past three decades. Following the 'Education Reform Act 1988' participation in HE doubled from 17% to 34% in the following ten-year period (Mayhew et al., 2004), and has continued to grow, reaching a high of 50% in 2018. As a result, UKHE has undergone a "massification" over the last two decades (Dixon and O'Gorman, 2020).

Increased expansion has given rise to increased student diversity, with many institutions committing to supporting the widening participation agenda by attracting high percentages of students from underrepresented groups. The numbers of students from Black, Asian and

minority ethnic (BAME) backgrounds, those reporting disabilities, and those from international territories have steadily increased over time, altering the profile of students participating in UKHE today in comparison to previous decades (Connor et al., 2004; Kimball et al., 2016; UCAS, 2021).

In addition to massification and diversification, the introduction of, and continued increase in tuition fees has further shifted the purpose and remit of universities. For example, universities must now demonstrate value for money (VFM) in support of student recruitment, retention and satisfaction. Value for money has largely become associated with the demonstration of student employability (Dixon and O'Gorman, 2020), forcing universities to become more outcomes focused. Universities therefore have been transformed into market-driven, commercial entities, reliant upon their incomes from ever-increasing numbers of diverse students, (Davies, 2006). Like all businesses, universities must adapt their products to meet the needs and demands of their customers (Davies, 2006). Hence, considerable discourse over the last decade has centred on whether traditional teaching formats and scheduling, such as semesterised or year-long course delivery, built upon the long-established lecture-seminar nexus, effectively support the changing demands and challenges characteristic of modern UKHE.

An increasingly common approach taken by universities in response to changing needs and demands, is a shift to immersive teaching formats, more commonly and collectively known as "Block teaching". In the Block model, students typically study one module at a time, usually over a time-condensed period (Davies, 2006; Kofina et al., 2017; Swain, 2016). The immersive approach is intended to support students to explore topics in greater depth, as well as enabling them to develop a greater level of analysis and criticality over topics through a more concentrated focus (Kofina, et al., 2017). Research has demonstrated that immersive forms of learning may support improvements in engagement, attendance and attainment among undergraduate students, particularly those from diverse pathways to entry as is now typical in UKHE (Daniels, 2000; Davies, 2006; Dixon & O'Gorman, 2020; Sheldon & Durdella, 2009).

Another response to increasing massification and diversification of HE is Universal Design for Learning (UDL). The UDL framework recognises that learners are variable in relation to how they are motivated to learn, how they perceive information related to learning, and how they demonstrate their learning. Subsequently, a UDL approach espouses flexible options across three distinct areas; 1) multiple means of engagement, considering the interests and preferences of learners, ensuring that they are appropriately motivated by learning; 2) multiple means of representation, supporting the acquisition of information *via* a wide variety of learning resources; and 3) multiple means of action and expression, in which the demonstration of understanding may take multiple forms (Davies et al., 2013). Several studies have demonstrated positive student outcomes when applying UDL to curriculum design, including increasing student satisfaction and engagement (Al-Azawei et al., 2016). Of particular importance is the suggestion that learners from diverse cultural backgrounds benefit from the application of UDL to curriculum design (Chita-Tegmark et al., 2012).

Implementation of UDL is achieved through intentional instructional design approaches, which aim to embed UDL principles into the instructional experience. One such design approach is the "Cheese Sandwich" (Merry, 2019; Merry, 2021). The Cheese Sandwich draws on flipped learning approaches (Bergman & Sams, 2012) to repurpose contact time. In the Cheese Sandwich, the time learners spend with their teachers and peers is used to develop higher order cognition through active collaborative learning approaches as opposed to focusing on content transmission. Conversely, engagement with content and lower order cognitive skill

development takes place during self-directed study. Multiple means of engagement, representation and action and expression are applied to the Cheese Sandwich as a means of embedding UDL and reducing or removing learning barriers. The Cheese Sandwich has been used in the design of several postgraduate courses in traditional formats, and has been instrumental in the institutional adoption of UDL by a British university (Merry, 2019; Merry, 2021).

Despite the wealth of literature that exists on Block teaching and UDL in isolation, there is a relative lack of information on the effectiveness of combining the two approaches, especially in terms of how UDL instructional design approaches have been used in the design of immersive learning experiences. A particular gap, especially in relation to the UKHE context, is the student perception of UDL, as part of their learning experiences. For example, a shortage of research exists investigating the extent to which students experience UDL in their courses or the perceived importance of UDL learning and teaching practices to their effective learning, whether delivered according to traditional or more immersive teaching formats.

Therefore, the aim of this study is to uncover the extent to which participants in an immersive course of study have encountered learning, teaching and assessment practices that reflect UDL, following the course's design with the Cheese Sandwich instructional design approach. A secondary aim is to assess how important participants perceive UDL learning, teaching and assessment practices to be in relation to supporting their learning in an immersive context. Specifically, the study will address two questions:

1) To what extent did students encounter a variety of different learning and teaching practices (that collectively reflect the principles of UDL) on their immersive course?

2) To what extent did students perceive UDL learning and teaching practices to be important in supporting learning on their immersive course?

## Methodology

### Participants
Participants were 30 staff (58% Females; 42% Males) enrolled in the Effective Learning & Teaching (EL&T) course at a post 1992 British University. Effective Learning & Teaching is a non-credit, non-award bearing course for academic staff with less than three years' HE teaching experience. It is a mandatory requirement for staff that wish to enrol onto the institutional Postgraduate Certificate in Learning and Teaching in HE (PGCLTHE), which is worth 60 credits in the UK system and represents a recognised HE teaching qualification in UKHE. Participants in EL&T represented each of the University's four academic faculties (32% Health & Life Sciences; 40% Business & Law; 14% Computing, Engineering & Media; 14% Art, Design and Humanities). All experimental procedures associated with the study were explained to the participants before they gave written informed consent to participate. The study was approved by the institutional Ethics Committee in accordance with British Educational Research Association (BERA) guidelines.

### Materials
The extent to which UDL learning and teaching practices in EL&T were experienced by participants, and the extent to which they perceived UDL learning and teaching practices as important to supporting their learning was assessed using the UDL perception survey (Kennette & Wilson, 2019). The survey consists of two dimensions; 1) the extent to which UDL learning

and teaching practices have been experienced by respondents and 2) the extent to which respondents perceive those UDL learning and teaching practices to be effective in supporting their learning. Dimensions are comprised of 36 items, each adapted from the list of UDL "checkpoints" published by The Centre for Assistive Special Technology, for each of the UDL principles (CAST, 2018). Responses are made according to a five-point Likert scale (1 – 5) for each dimension where for Dimension 1, 1 = Never; 2 = Rarely; 3 = Sometimes; 4 = Often and 5 = Always. For Dimension 2, 1 = Not important ; 2 = Slightly important ; 3 = Moderately important; 4 = Very important, and 5 = Extremely important. Since each survey item reflects the CAST UDL checkpoints, each of which is supported with empirical evidence, the questionnaire is said to be high in face validity. Responses to the survey are anonymous.

**Procedures**
The survey was distributed to participants in electronic format, as part of the course evaluation, undertaken following completion of EL&T. Completion of the survey required approximately 10 minutes, and was live for three weeks, during which participants were reminded three times (once per week) to complete it.

Effective Learning & Teaching is delivered for six hours per day for three full days. Upon completion of the course, it is intended that participants will have achieved the following learning outcomes; 1) create clear, realistic and measurable learning outcomes; 2) demonstrate inclusivity and differentiation in session design and delivery; 3) apply active learning techniques in teaching sessions; 4) demonstrate effective checking of learning and associated feedback; 5) demonstrate effective planning of learning and teaching in a range of contexts. Participants are required to undertake a 20-minute microteaching task during the afternoon of day 3 to assess their achievement of the learning outcomes.

Each instructional experience in EL&T, which represents all learning and teaching activity related to each topic covered on the course, was designed using a novel instructional design approach called the Cheese Sandwich. The Cheese Sandwich encompasses flipped learning (Bergman & Sams, 2012), meaning self-directed study is largely used for content engagement, and diagnostic assessment, with contact time devoted to practice of higher order cognitive skills *via* active, collaborative learning, intentionally supported with immediate feedback. In the Cheese Sandwich, the process of learners achieving learning outcomes is extended across three phases; 1) self-directed learning that happens before learners learn with direct support from teachers and peers (the first slice of bread); 2) learning that is directly supported by teachers and peers (the cheese); 3) self-directed learning that happens after learners learn with direct support from teachers and peers (the second slice of bread) (Figure 1). Each Cheese Sandwich has a set of learning outcomes associated with it, which can be achieved across the whole sandwich as shown in Figure 1. Multiple learning pathways to achieve learning outcomes associated with the sandwich are created by applying the three UDL principles: engagement, representation, and action and expression at each point in the sandwich (Figure 1). Pathways are created by accounting for the learner variability inherent within learners, with the specific aim of reducing or removing learning barriers.

| Achievement of learning outcomes containing Bloom's skills – emphasis on transferability | | |
| Apply multiple means of getting learners interested in learning (Engagement) | | |
| Provide multiple types of learning resource (Representation) | | |
| Provide multiple ways for learners to demonstrate learning (Action & Expression) | | |

| Pre time with teachers and peers | Time with teachers and peers | Post time with teachers and peers |
|---|---|---|
| • Self-directed study<br><br>• Primarily for content engagement<br><br>• Development of lower order cognitive skills through low demand activities<br><br>• Opportunities for self-assessment (feedback) of lower order cognitive skills reflecting learning outcomes<br><br>• Opportunity to reflect on progress<br><br>• Opportunity for learners to ask questions, seek clarification and give feedback | • Teacher/peer supported study<br><br>• Recap of content and key learning points covered during self-directed study<br><br>• Primarily for supported higher order cognitive skills development<br><br>• Explanation and/or demonstration of higher order skills<br><br>• Active collaborative practice of higher order skills (active learning with peers) reflecting learning outcomes<br><br>• e-tivities reflecting learning outcomes<br><br>• Feedback-corrected practice (Mastery-oriented feedback)<br><br>• Active practice of higher order skills should be repeated in this phase<br><br>• Opportunity to reflect on progress<br><br>• Opportunity for learners to ask questions, seek clarification and give feedback | • Self-directed study<br><br>• Opportunities to revisit in-session learning<br><br>• Evaluation to test capability to apply higher order cognitive skills through formative assessment reflecting learning outcomes<br><br>• Opportunities for self-assessment<br><br>• Opportunity to reflect on progress<br><br>• Opportunities for learners to ask questions, seek clarification and give feedback |

**Figure 1.** The Cheese Sandwich approach to instructional design

**Analysis**

Scores for each UDL perception survey item in Dimensions 1 and 2 are presented as means ± standard deviations.

# Results

The extent to which EL&T participants experienced UDL learning and teaching practices whilst on the EL&T course is presented in Table 1. Of the 36 items in Dimension 1 of the UDL Perception Survey, 32 items received a mean score ≥3.5, meaning that they were experienced "often" or "always" in EL&T.

The extent to which EL&T participants perceived UDL learning and teaching practices to be important in supporting their learning is presented in Table 2. Of the 36 items in Dimension 2 of the UDL Perception Survey, 30 items received a mean score ≥3.5, demonstrating that they were perceived as "extremely" or "very" important in supporting learning in EL&T. Participant perception was that each of the 30 items considered "extremely" or "very" important in supporting learning, occurred "often" or "always" in EL&T.

**Table 1. Effective Learning and Teaching course participant experiences of UDL learning and teaching practices. Values are means ± standard deviations.**

| For each item, indicate how much you experienced this on the EL&T course (1 = Never; 2 = Rarely; 3 = Sometimes; 4 = Often and 5 = Always. | Experience of UDL learning and teaching practices | |
|---|---|---|
| | *M* | *SD* |
| **Representation** | | |
| Present the same course content in multiple ways (video, text, images, etc.) | 4.1 | 0.8 |
| Offer electronic versions of textbooks | 3.5 | 1.1 |
| Post handouts on Blackboard (or make them available digitally) | 4.7 | 0.6 |
| Include subtitles on videos (closed captioned) | 3.0 | 1.2 |
| Upload files can be read using text-to-speech software (e.g., Word documents PDFs) | 4.4 | 1.2 |
| Provide clear guidelines for summative (graded) assessments (e.g., example/sample assessment) | 4.8 | 0.4 |
| Include a field trip | 1.1 | 0.2 |
| Capture teaching sessions and made them available to stream before or after class (DMU Replay / video or podcast) | 4.5 | 0.9 |
| Make available a glossary of terms (on Blackboard or other) | 3.5 | 0.9 |
| Offer alternatives for auditory info (e.g., transcripts of videos) and visual info (e.g., description of images) | 3.2 | 1.3 |
| Highlight patterns and relationships in the course content | 3.3 | 1.3 |
| **Engagement** | | |
| Offer interesting and relevant assessments | 4.2 | 0.8 |
| Allow for some autonomy and/or control in student learning (e.g., options for practice and graded assessments (topic and / or format); or choices on tests | 4.3 | 0.9 |
| Provide clear guidelines for assessments (e.g., example/sample assignment) | 4.4 | 1.0 |
| Let students decide which topics are covered in the course | 3.9 | 1.4 |
| Use hands-on activities in class | 3.7 | 1.1 |
| Connect course content to real world experiences | 4.6 | 0.7 |
| Communicate with students (in class, outside of class, via Blackboard or email) | 4.6 | 0.7 |
| Provide clear and specific feedback on assessments | 4.7 | 0.6 |
| Offer a choice of how students want to receive feedback on assessments (e.g., verbal or written feedback) | 4.0 | 1.4 |
| Allow students to re-submit assessments | 3.8 | 1.2 |
| Include peer-evaluation as part of the course or assessments | 4.0 | 1.0 |
| Make PowerPoint slides available to students | 4.6 | 0.8 |
| Include group work and collaboration with other students (e.g. discussions) | 4.7 | 0.6 |
| Provide opportunities for self-assessment/self-evaluation and reflection | 4.7 | 0.5 |
| Answer questions about course content or assessments outside of class (e.g., Blackboard, email) | 4.6 | 0.8 |
| Use gender-neutral language and inclusive examples (race/culture, etc.) | 4.4 | 0.9 |
| Minimise threats and distractions in the learning environment | 4.4 | 0.7 |
| Motivate students to do their best work | 4.5 | 0.6 |
| **Action & Expression** | | |
| Flexible due dates on summative (graded) assessments (e.g., allowed to submit it late) | 3.8 | 1.3 |
| Offer formative (practice / ungraded) assessment to practice the course content | 4.2 | 1.0 |

| | M | SD |
|---|---|---|
| Provide sufficient (or unlimited) time for tests | 3.6 | 1.4 |
| Provide rubrics for summative (graded) assessments | 4.2 | 1.2 |
| Guide you using increasingly difficult activities or formative (practice / ungraded) and summative (graded) assessments | 4.5 | 0.7 |
| Guide goal-setting and the development of student learning strategies | 4.0 | 0.9 |
| Provide opportunities for students to monitor progress (e.g., grades posted on Blackboard, regular in-session feedback) | 4.4 | 0.9 |

*Note.* N = 30. Participants were drawn from a post 1992 British University, and represented each of the university's four academic faculties (32% Health & Life Sciences; 40% Business & Law; 14% Computing, Engineering & Media; 14% Art, Design and Humanities).

**Table 2.** *Perceived importance of UDL learning and teaching practices to learning among Effective Learning and Teaching course participants. Values are means ± standard deviations.*

| For each item, indicate how important it was in supporting your learning on the EL&T course (1 = Not important ; 2 = Slightly important ; 3 = Moderately important; 4 = Very important, and 5 = Extremely important. | Perceived importance of UDL learning and teaching practices to learning | |
|---|---|---|
| | *M* | *SD* |
| **Representation** | | |
| Present the same course content in multiple ways (video, text, images, etc.) | 4.0 | 0.9 |
| Offer electronic versions of textbooks | 4.3 | 0.9 |
| Post handouts on Blackboard (or make them available digitally) | 4.7 | 0.6 |
| Include subtitles on videos (closed captioned) | 3.2 | 1.4 |
| Upload files can be read using text-to-speech software (e.g., Word documents PDFs) | 3.5 | 1.3 |
| Provide clear guidelines for summative (graded) assessments (e.g., example/sample assessment) | 4.8 | 0.4 |
| Include a field trip | 2.2 | 1.2 |
| Capture teaching sessions and made them available to stream before or after class (DMU Replay / video or podcast) | 4.3 | 0.9 |
| Make available a glossary of terms (on Blackboard or other) | 3.6 | 1.2 |
| Offer alternatives for auditory info (e.g., transcripts of videos) and visual info (e.g., description of images) | 3.2 | 1.4 |
| Highlight patterns and relationships in the course content | 4.2 | 0.9 |
| **Engagement** | | |
| Offer interesting and relevant assessments | 4.6 | 0.5 |
| Allow for some autonomy and/or control in student learning (e.g., options for practice and graded assessments (topic and / or format); or choices on tests | 4.0 | 1.0 |
| Provide clear guidelines for assessments (e.g., example/sample assignment) | 4.8 | 0.5 |
| Let students decide which topics are covered in the course | 2.8 | 1.2 |
| Use hands-on activities in class | 4.3 | 0.8 |
| Connect course content to real world experiences | 4.7 | 0.5 |
| Communicate with students (in class, outside of class, via Blackboard or email) | 4.7 | 0.6 |
| Provide clear and specific feedback on assessments | 4.8 | 0.4 |
| Offer a choice of how students want to receive feedback on assessments (e.g., verbal or written feedback) | 3.6 | 1.3 |
| Allow students to re-submit assessments | 3.7 | 1.2 |
| Include peer-evaluation as part of the course or assessments | 3.8 | 1.1 |
| Make PowerPoint slides available to students | 4.6 | 0.6 |
| Include group work and collaboration with other students (e.g. discussions) | 4.4 | 0.8 |

| | | |
|---|---|---|
| Provide opportunities for self-assessment/self-evaluation and reflection | 4.2 | 1.0 |
| Answer questions about course content or assessments outside of class (e.g., Blackboard, email) | 4.6 | 0.7 |
| Use gender-neutral language and inclusive examples (race/culture, etc.) | 3.6 | 1.3 |
| Minimise threats and distractions in the learning environment | 4.2 | 0.9 |
| Motivate students to do their best work | 4.6 | 0.7 |
| **Action & Expression** | | |
| Flexible due dates on summative (graded) assessments (e.g., allowed to submit it late) | 3.4 | 1.4 |
| Offer formative (practice / ungraded) assessment to practice the course content | 4.3 | 1.1 |
| Provide sufficient (or unlimited) time for tests | 3.4 | 1.5 |
| Provide rubrics for summative (graded) assessments | 4.7 | 0.6 |
| Guide you using increasingly difficult activities or formative (practice / ungraded) and summative (graded) assessments | 4.3 | 0.7 |
| Guide goal-setting and the development of student learning strategies | 4.2 | 0.7 |
| Provide opportunities for students to monitor progress (e.g., grades posted on Blackboard, regular in-session feedback) | 4.4 | 0.8 |

*Note.* N = 30. Participants were drawn from a post 1992 British University, and represented each of the university's four academic faculties (32% Health & Life Sciences; 40% Business & Law; 14% Computing, Engineering & Media; 14% Art, Design and Humanities).

## Discussion

The first the aim of this study was to discover the extent to which students on an immersive programme of study encountered UDL learning, teaching and assessment practices. The results showed that participants experienced UDL learning, teaching and assessment practices to a considerable extent, since 32 of the 36 UDL checkpoints were perceived to occur frequently throughout EL&T.

As can be seen (Table 1), all the checkpoints for the engagement as well as action and expression principles were perceived to occur "often" or "always" in EL&T. The engagement principle reflects the requirement to motivate learners and keep them interested in learning. Important factors supporting motivation from an engagement perspective include authentic assessments that possess direct career relevance, ongoing formative feedback, including that derived from self-assessment, supporting the checking of progress, and the removal or reduction of threats and distractions in the learning environment (Kennette & Wilson, 2019). Immersive instruction with its concentrated focus (Kofinas et al., 2017) reduces the requirement for learners to divide their attention across multiple topics, and so would appear to support the minimisation of threats and distractions central to learner motivation. Furthermore, the concentrated focus of immersive instruction requires learning and subsequent assessment to be lean, targeted, and authentic, whilst also being closely tied to the instructional experience, with learners frequently working on assessment pieces in class (Weldon, 2022). As such, the Cheese Sandwich, as an instructional design approach appeared to enable the fusion of important aspects of UDL, and immersive instruction related to the principle of engagement.

The action and expression principle reflects the ways in which learners demonstrate their learning, espousing options, choices, and flexibility, but also the need for formative assessment and checking of progress in relation to assessment. Similarly, optimal immersive instruction appears to require a closer link between assessment and learning than that provided by traditional teaching models, with learners often working on assessed pieces in class, providing an ongoing feedback loop, and enabling learners and teachers to gauge where learners are in

relation to assessment performance (Weldon, 2022). As per the engagement principle, the Cheese Sandwich appeared to enable the fusion of important aspects of UDL and immersive instruction regarding the action and expression principle.

A total of seven of the eleven representation checkpoints were perceived to occur frequently during EL&T. Three of the remaining checkpoints were perceived to occur "sometimes". These were; 1) include subtitles on videos; 2) offer alternatives for auditory info (e.g., transcripts of videos) and visual info (e.g., description of images); and 3) highlight patterns and relationships in the course content. Such checkpoints occurring "sometimes" as opposed to "often" or "always" possibly reflects the fact that the creation of learning resources, including videos and images was shared among several staff and so some inconsistencies in relation to subtitles, transcripts, and image descriptions may have been present. For example, since the present study represents the first time EL&T had been delivered in an immersive format, no standard approach was adopted by staff teaching in EL&T in relation to the creation of learning resources. Similarly, since each distinct topic in EL&T was taught by a different individual, some may have highlighted patterns and relationships in the content, whereas others may have not. Based on the outcomes of the present study, staff now take a consistent approach in terms of creating learning resources (inclusion of subtitles, transcripts, and image descriptions etc.), and the highlighting of patterns and relationships in the content. The checkpoint that reflects the inclusion of a field trip was perceived to "never" occur. This is unsurprising since no field trip is offered as part of EL&T.

The second aim of the study was to uncover the perceived importance of UDL learning, teaching and assessment practices in relation to supporting participant learning in an immersive context. As can be seen in Table 2, 30 of the 36 UDL checkpoints were considered "very" or "extremely" important in supporting learning in EL&T, with each of the 30 items perceived to occur "often" or "always" in EL&T. Hence, although four of the UDL checkpoints were perceived to only occur "sometimes" or "never", in EL&T none of those four checkpoints were perceived as being of great importance to supporting learning. Hence, the immersive design of EL&T using the Cheese Sandwich appeared to enable participants to frequently experience the most important UDL learning, teaching and assessment practices for supporting learning.

Of the six items not perceived to be important in supporting learning in EL&T, five were considered moderately important for supporting learning. These were; 1) include subtitles on videos (closed captioned); 2) offer alternatives for auditory info (e.g., transcripts of videos) and visual info (e.g., description of images); 3) let students decide which topics are covered in the course; 4) flexible due dates on summative (graded) assessments (e.g., allowed to submit it late); 5) provide sufficient (or unlimited) time for tests. None of the participants in EL&T reported visual or auditory impairments, hence it is perhaps unsurprising that the inclusion of subtitles, the offering of alternatives for auditory information, and image descriptions were not considered "very" or "extremely" important for learning. Since the participants were novice teachers, and perhaps not yet overly familiar with various pedagogic ideas and approaches, it is perhaps understandable that letting students decide which topics are covered in the course was also only considered moderately important. The opportunity to deliver the microteaching task at a later date than the final day of EL&T is offered to participants in the event that the final day clashes with other commitments they may have. However, each participant delivered their microteaching session on the final day as planned. Hence, this may explain why having flexible assessment dates was considered only moderately important. No formalised, timed tests were given during EL&T, only short quizzes and other checks for understanding. Hence, it is again not surprising that providing unlimited time was considered only moderately

important to supporting learning. Had formalised, timed tests been included in EL&T, participants may have considered it to be of greater importance to supporting their learning. One checkpoint was considered slightly important for supporting learning in EL&T, which was the inclusion of a field trip. The immersive nature of the course and associated time constraints mean that a field trip is impractical. In addition, a field trip is not required for successful achievement of the course learning outcomes.

The Cheese Sandwich approach to designing an immersive course appeared to enable participants to experience learning and teaching practices reflective of UDL principles. Many of those UDL principles were considered important in supporting participant learning on the EL&T course. Despite there being a relative lack of research on student UDL perceptions in the UKHE context, the present results align with previous studies conducted in the US context in which UDL has been intentionally designed into instructional experiences (Black et al., 2015; Davies et al., 2013; Kennette & Wilson, 2019; Schelly et al., 2011; Smith, 2012).

It should be noted that the participant sample was not exceptionally large and none declared a disability, learning difference or other impairment prior to the course commencing. Although UDL is essentially an anticipatory response to designing learning based on the variability of learners, with the aim of making learning more accessible, inclusive and equitable, it is possible that a different cohort of participants, particularly one containing a larger number of learners with various disabilities, learning differences and impairments may have perceived things differently, especially the importance of some UDL learning, teaching and assessment practices such as captioning, and image descriptions etc. It should also be noted that EL&T is a course that lasts three days as opposed to a unit that lasts several weeks. As such, inferences about the suitability of the Cheese Sandwich as an immersive unit or course design tool, should not be solely made from the findings presented in this paper, despite the promising results.

## Disclosures
No conflicts of interest, financial or otherwise, are declared by the authors.

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