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Applying the PECSL: using case studies to demonstrate the Pedagogy of Experience Complexity for Smart Learning

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Abstract

This paper discusses the uses and applications of the Pedagogy of Experience Complexity for Smart Learning (PECSL), a four-tier model of considerations for the design and development of smart learning activities. Using existing mobile apps and relevant activities as illustrative examples, the PECSL is applied to indicate concepts and mechanisms by which useful pedagogical considerations can work alongside user-centred design principles for the design and development of smart learning in urban hyper-localities. Practical application of the model is discussed using real world examples of activities as a basis to demonstrate the potential for manifold opportunities to learn, and plan for experience complexity in a smart learning activity. Case study approaches reflect on aspects of the PECSL in how it might be a useful and pragmatic guide to some of the issues faced when designing digital citizen learning activities in complex urban environments.

Keywords: Smart pedagogy, Smart learning, Pedagogical model, User-centred design, Learning design, Phenomenography

Introduction

This paper focuses on application of the Pedagogy of Experience Complexity for Smart Learning (PECSL) model of considerations for the design and development of smart learning activities. For the purposes of discussion here, smart learning activities are generally conceptualised as journeys in real world urbanised digitally connected spaces, formed from several hyperlocal (Carroll et al., 2017) locations related by topic of activity, with digitally mediated participant interactions using 'smart enough' technologies (Green, 2019). The term hyperlocal is useful to define a local area of closely related places or specific communities, arising from a term originally describing 'hyperlocal media' such as blogs and local news websites (Van Kerkhoven & Bakker, 2014). Along with Carroll et al.'s work, others have used this term in relation to learning situated in a close area of locality (e.g. Martin et al., 2014). Participants in smart learning journey activities often take part voluntarily, and choose what they might find of interest, using their own devices to digitally interact with aspects of an activity.

The PECSL model is founded in primary research investigating smart learning journeys using the methodology of phenomenography, examining participant experience variation using a structure of awareness analysis framework (Bruce et al., 2004; Cope, 2004). Taking inspiration from digital artefact user centred design (UCD) (Gibbons, 2016), and user experience considerations such as those described in key UCD texts (Garrett, 2010; Saffer, 2010), the PECSL adopts a position of flexible layers of considerations based in participant experience variation that may impact stages of learning design in the complex terrain of smart learning environment activities. The PECSL model, together with the research it is based upon are summarised in this paper in subsequent sections. An additional paper by the author (Lister, 2021d) outlines in more detail what the PECSL is, how it came about and why it might be useful and relevant to smart learning and smart learning environments. The further challenges of how to measure 'implicit' learning in these contexts are discussed in a forthcoming paper (Lister: Measuring learning that is hard to measure: using the PECSL model to assess implicit learning, in preparation), outlining potential mechanisms for measuring aspects of learning using the PECSL model alongside cognitive domain equivalences.

Manifold opportunities for learning exist within the concepts, ideas, topics, technologies and interactions of smart learning environments and activities that are further explored and discussed in this paper. Activities can be scoped and designed for a wide range of purposes, and learning can play a part either as an explicit aim, or as an implicit or covert goal (Lister, 2020). For example, some activities may be formal, informal or non-formal learning about topics and aspects of interest in locations, and learning would be a specified aim. Other activities may not be about learning of any kind, but may be about citizen engagement, feedback gathering or creative discovery and content creation, yet learning might still be present in more general terms of advancing the communication, agency and digital skills of participant learners. This kind of learning may even be a covert aim of an activity (hidden, but intended by those facilitating the activity), and highlights the "complex conversational process that can and usually does lead to much that is of value beyond what is planned" (Dron, 2018, p. 3). Scoping activities in conjunction with suitable skills frameworks can support a participant centred awareness for design and development, adapting suitable pedagogical frameworks where appropriate (Carretero et al., 2017; Lister, 2020; Vosloo, 2018).

Whilst these activities, the environments they are situated in and the technologies that might mediate participant interactions all come with issues and challenges specific to the nature of activity and location, core principles might be recognised that are common and relevant to many activities. The PECSL may therefore be a useful addition to enabling and embedding pedagogical considerations within user-centred design and development, involving learner experience as an integral part of that process.

Summary of research

The Pedagogy of Experience Complexity for Smart Learning (PECSL) is based on a phenomenographic study into experiencing a smart learning journey. Research was carried out to investigate two different yet similar smart learning activities conceptualised as real-world journeys, formed by several hyperlocal points of interest related by topic in a close locality that together formed a 'smart learning journey'. These activities were located in London, UK and Valletta, Malta. Points of interest were augmented with

digital interactions using ad hoc free smartphone apps and technologies, permitting participant access to context aware content. Apps used were HP Reveal,[1] Edmodo[2] and Google MyMaps.[3] Knowledge content was created and hosted on a custom website,[4] supplemented by other digital knowledge commons[5] content. Participants were requested to create their own content relating to their participation in the journey and upload to Edmodo group areas. All activity participants took part voluntarily in their own time, and did as much or as little of the journey as they chose. Often, though not always, participants took part as a group.

Sample and method

Twenty-four participants agreed to take part in research interviews, after participating in a smart learning journey activity. Participants were drawn from two universities in two countries, London Metropolitan University, UK and the University of Malta. Academic research ethical compliance for procedures and sample groups were obtained from each university. All participants gave informed consent. The sample was purposeful and convenience (Reed, 2006, p. 6), as all participant interviews were voluntary. Maltese based students were studying various undergraduate or post-graduate degrees in education orientated programmes, London based students were studying BA English Literature & Creative Writing. A wide international demographic was represented across cohorts in both countries, with age range approximately 20 to 35 years old. A potential limit of the study was gender balance, with 19 female and 6 male students represented. This may be due partly to the low number of possible male participants available in the cohort groups, and to the voluntary nature of participating (e.g. Souleles et al., 2014, p. 4). Reed considers gendered distinction of experience as a potentially artificial construct within the terrain of phenomenographic inquiry and 'individuals most likely to provide ... variation in ways of experiencing' (2006, p. 6). In this study I relied on voluntary recruiting, but Reed's artificial distinctions regarding gender and experience may apply, and may merit further research. Taking into account practical limitations as well as iterative estimation for different variations to emerge, 24 participants were considered sufficient, giving a snapshot of variation (Åkerlind et al., 2005; Trigwell, 2000) that included different demographics and subject disciplines.

Methodology

Phenomenography (Marton, 1981) was selected as the methodology suitable for the research as learner experience is at the heart of the investigation and phenomenography examines experience variation using an emergent interview approach. Qualitative research work in related fields also use phenomenography, for example technology enhanced learning (e.g. Souleles et al., 2014) and user experience (e.g. Kaapu & Tiainen, 2010; Zoltowski et al., 2012). Phenomenography draws on Gurwitsch's ideas about theme, thematic field and margin (e.g. Gurwitsch, 2010) to analyse experience using a 'structure of awareness' analytical framework (Cope, 2004). Known as a second order

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[1]https://hpreveal.com (defunct)
[2]https://edmodo.com
[3]https://google.com/mymaps
[4]https://smartlearning.netfarms.eu
[5]WikiPedia, WikiMedia and other Creative Commons content.

perspective (Marton, 1981, p. 2; Marton, 1996, p. 183; Sjöström & Dahlgren, 2002, p. 340), phenomenography is non-dualist (Marton, 1996) in nature, making an epistemological assumption that there is only one world as experienced by the learner, "where there is an internal relation between the inner world and the outer world" (Ireland et al., 2009). Here we are not concerned with ontological discussions of reality, or of the essence of a phenomenon (Marton & Booth, 1997, p. 117), but rather only the reality concerning phenomena of interest to the research as experienced by individuals being researched.

Analysis and emerging pedagogy

Using an interpretation of the structure of awareness analytical framework (Cope, 2004), a phenomenographic outcome space (e.g. Marton & Pong, 2005; Reed, 2006, p. 8) of 'experiencing a smart learning journey' was formed, with four categories of experience variation, each with four layers of complexity. This was achieved by discovering units of meaning (Marton & Pong, 2005; Reed, 2006) in a structure of awareness for the activity, noting commonalities and difference variations across the utterances at collective level in the interview transcripts. Categories of variation were somewhat relational, partially inclusive and may have some hierarchical relationship to each other (Lister, 2021a). Analysis was then reviewed by a co-judge (Booth, 1992, p. 68) to further review the analysis perspective and establish its communicability and interpretive awareness (Cope, 2004; Sandberg, 1997). Reproduced here from Lister (2021d) for sake of convenience, Table 1 shows the relational categories of experience complexity of a smart learning journey that formed the foundation of the Pedagogy Of Experience Complexity For Smart Learning (PECSL), further outlined in this paper and elsewhere (Lister, 2021a, 2021b, 2021d).

Table 1 The experience complexity of a smart learning journey (Lister, 2021d)

	Category A Doing the tasks	Category B Discussing	Category C Being there	Category D Knowledge and place as value
Level 4	Research tasks and topic beforehand, take time doing and reflecting on tasks	Share tasks and content, do additional learning, discuss related experience and knowledge	Live it, being in the picture, live the atmosphere, take more time, seeing the whole and related parts	Knowing and seeing knowledge and place as valuable, personal experience, deeper engagement and 'possibilities'
Level 3	Tasks indirectly related to coursework or assessment	Discuss tasks and topic in relation to time and place	Experience in the place relating to other people, aspects and memories. Make connections between places and knowledge	Engage further with knowledge in topics, create upload content for tasks and at locations
Level 2	Do the tasks of interest, directly related to coursework or assessment	Discuss the tasks, help each other with tasks and tech	Locations are of some interest, potential for learning, creativity or inspiration	Click a few content links, save links 'for later', make screenshots of augmentations or tasks
Level 1	Do the tasks, go home	Discuss who does the tasks, how technology works	Go to locations, do tasks, go home	No engagement with content or knowledge, don't create or upload content

The categories and levels of experience complexity provided glimpses of possible ways to anticipate areas of potential experience variation that participants may have, depending on types of activity and emphasis on focus of learning. These potentially indicated possible interpretations of intrinsic or extrinsic motivation and relevance, dependent on the nature and location of a smart learning activity.

Planning for experience complexity

The first two tiers of the PECSL considerations model are formed by the experience relevance structures and related pedagogies of a smart learning activity, to support learning based in potential experience variation. Considerations of learning can be particularly challenging in smart learning environments, because of the hybrid nature of activity types and potential participant groups that require flexibility to support design, scope and interactivity. Pedagogical concepts require understanding of the inter- and intra-contextual (Marton & Pong, 2005) fluid experience of a smart learning activity in the real world to provide this flexibility, anticipating participant potential experience for type and complexity may then assist in further enrichment and value of the activity overall. The PECSL model attempts to offer a participant-centred approach to design and development of smart learning activities, acknowledging the participant (learner) as a complex human agent entity in a shifting territory of this re-constitutive experience.

The foundation of the PECSL model derives from the experience variation that emerged in the research, and therefore places focus on activity and participant experience rather than personalised digital interactions and types of learner. Figure 1 visualises the PECSL experience variation categories in a structure of

Fig. 1 Four categories of experience variation for the structure of awareness in a smart learning journey
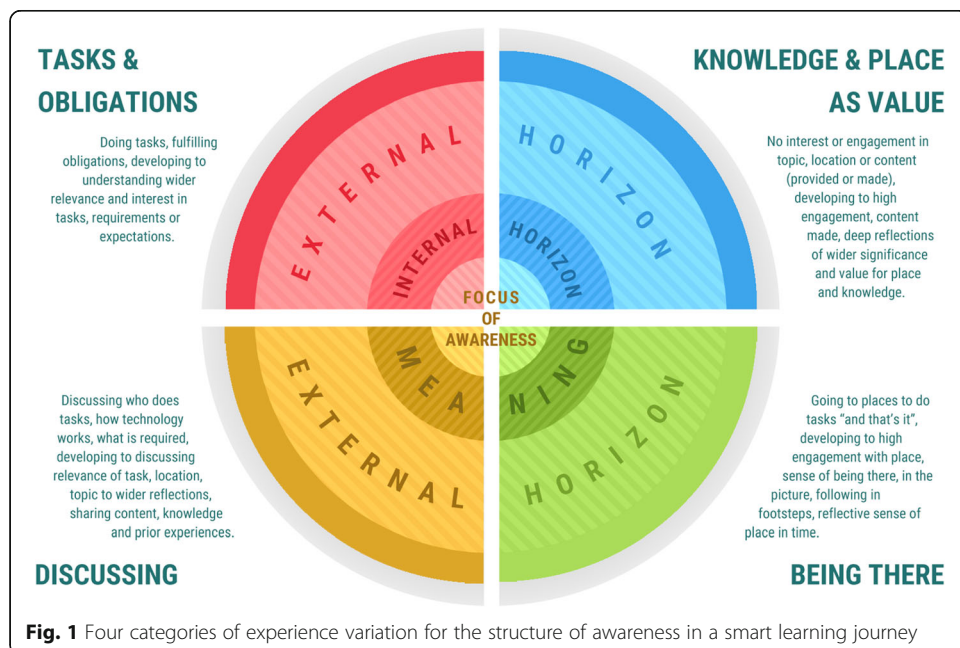
awareness, briefly summarising range of experience and implied possible combinations of variation.

Considering the four categories of experience variation that emerged from the research, it is possible to envisage and plan for experience through scope of activity and type(s) of pedagogical approach.

Experience relevance and related pedagogies

Planning for anticipated types and levels of experience assists in scoping the design of the smart learning activity, placing emphasis on how each category of experience variation might be utilised to potentially enhance deeper experience complexity. Table 2 describes each experience variation category of description as a relevance structure for aspects and levels of learning, with related pedagogies to support planning for levels of experience variation and complexity.

Inquiry-based learning, dialogic learning, place-based learning and creative learning are considered as 'good fit' related pedagogies to the experience variation categories described. For example, focusing on participant experience of task and obligation, inquiry-based learning can take the form of a gamified learning design or a discovery journey with clear questions assigned to learners, supporting deeper levels of this kind of experience. Likewise, a dialogic learning approach to support richer experiences of discussing may utilise peer-learning techniques in various learning design contexts, encouraging discussion of deeper aspects of learning. It is anticipated that just as

Table 2 Summary of experience relevance structures and related pedagogies in a smart learning journey

Category of description for experience variation	Experience relevance structure (descriptive guidelines for levels of complexity)	Related pedagogy
Tasks and obligations	- Doing the tasks or requirements, that's it - Doing tasks of interest, for coursework or assessment relevance - Tasks become related to other; coursework, purpose or interest - Researching topic, beyond coursework, related to wider interest, engagement	*Inquiry-based learning* Discovery Exploratory Gamification Problem-based Creative
Discussing	- About who does what for tasks or requirements - What the tasks or requirements are about or for - What tasks mean in connection with location and discussions - Discussing, sharing, of content, relating to wider relevance	*Dialogic learning:* Peer learning Collaborative Cooperative Groups
Being there	- Going to location, do task, that's it - Some locations record for facts and tasks - More relationships between location content and task - Seeing wider setting for locations, tasks, content and further relevance	*Place-based learning:* Creative Exploratory Discovery Gamification
Knowledge & place as value	- No interest or engagement, don't create content, don't read anything, see it all as pointless - Low interest, basic content made (e.g. screenshots, a few selfies) - More engagement, more reading or content making, very focused on location - Seeing personal gain (in content), deeper reflections, potentials, possibilities, wider application	*Creative learning:* Student directed Place-based Inquiry-based Gamification Problem-based Project-based

experience variation is an intertwined relationship between categories, so pedagogical approaches co-exist together within a single activity, and can be emphasised in different directions dependent on activity purpose, aims and context.

Inquiry-based learning

Experience relevance: Tasks & Obligations An inquiry-based learning pedagogical approach (e.g. Chiang et al., 2014) will act as a basis for experience variation that is motivated by tasks and what a participant perceives as 'what they are supposed to do'. Inquiry-based learning can expand from simple question based tasks to more complex active learning strategies. Inquiry-based learning can help participants to find engagement and reasons for taking part.

Dialogic learning

Experience relevance: discussing Dialogic learning is considered as any learning that involves talking. Talking and discussing emerged as a significant experience variation in the primary research, ranging from simple topics of how to find locations or use the apps or map to more complex discussion on task questions, places or cultural differences of place. After participating in an activity, further discussion can be supported and encouraged, borrowing techniques from action learning (Lin et al., 2011, Lister, 2022). Planning for discussing can lead to much that is of value for participants. Through reflection, learning can be generalised to other situations, and as a consequence, "the learning cycle through experience is formed" (Lin et al., 2011, p. 55).

Place-based learning

Experience relevance: being there Consideration of the impact of place lies at the heart of smart learning activities scoped as journeys in the real world. The experience of being there, the interplay between contextual, reflective and cultural can promote manifold opportunities for learning, and for engaging the participant in a sense of value and direct relevance. For example, Jayanandhan's (2009) pedagogy of place assists in scoping an introduction and discovery of aspects for reflection dependent on the participant groups, nature and scope of an activity.

Creative learning

Experience relevance: knowledge & place as value Fostering a sense of value about knowledge, content and information that relate to a place form the core challenge of any smart learning activity situated within and around real world locations. If participants experience a disconnect between themselves, the context-aware content provided and accessed and their perceived existing relevance structures, they may regard their effort to participate as wasted time and without value. Value of content 'in place', either as knowledge or creative value is therefore potentially a decisive driver of designing and developing an activity for engaged participation and learning.

Pedagogical relevance structures and epistemological considerations

The third and fourth tiers of the PECSL model of considerations are formed by pedagogical relevance structures and subsequent epistemological contexts. Relevance structures (Marton & Booth, 1997) of motivation, autonomy and socio-cultural-historical context of complex learning environments impact pedagogical choices for a smart learning activity. Issues of motivation and autonomy in relation to participant expectations and interpretations can impact participant experience in multiple ways, even potentially curtailing activity participation altogether (further explored in Lister, 2021c). For example, a simple inquiry-based learning approach may require less intrinsic motivation than a creative learner-directed approach. The autonomy and agency required to participate fully in smart learning activities are significant twenty-first century skills, particularly related to "self-direction, adaptability, flexibility, and collaboration" (Maina & González, 2016). Blaschke and Hase (2016) suggest that skills required to be an affective twenty-first-century learner have evolved from passive recipient to "analyst and synthesizer" (p. 26), describing the learner as "the major agent in their own learning, which occurs as a result of personal experiences" (p. 27).

Consideration of underlying theory and epistemology related to pedagogical approach and activity design and development can additionally offer useful and pragmatic understanding of participant experience influencing factors. For example, context can be considered as physical and virtual presence (Traxler, 2015, p. 197), socio-cultural contexts of place (Buell, 2005) and pedagogy of place (Jayanandhan, 2009) for interpretations of learning in authentic real-world environments. The complex learning environments formed by these elements may be considered as a three architecture terrain of material, social and epistemic factors, with interactions involving fast (automatic) and slow (subjective agency) thinking (Goodyear & Carvalho, 2012, p. 55). Breunig (2017) discusses "transformational learning", that "(n)on-formal education embeds learning content in activities across an array of settings providing wide latitude for self-direction and interpretation on the part of learners", (2017, p. 3). Smart learning should therefore seek for learning strategies to be in the hands of the learners themselves, to discover and shape learning both individually and in groups, building total immersion and engagement with knowledge and associated relationships to place (Lister, 2021b).

Applying the PECSL

By using an appropriate blend of practical and pedagogical considerations for the intended smart learning activity, together with planning for experience relevance, the four tiers of PECSL considerations seek to prompt ways of supporting the learner for greater sense of engagement and deeper experience complexity from participation in the activity. The PECSL attempts to acknowledge the wide range of learning that may be going on for the individual learner, for what may be of vital interest to them (Greeno & Engeström, 2014), perhaps in addition to any designed set of learning outcomes (Dron, 2018).

The 'Pedagogy of Experience Complexity for Smart Learning' comprises a four tier model of considerations, as outlined in previous sections concerning experience relevance structures, their related pedagogies, pedagogical relevance structures and epistemological context (Lister, 2021b, 2021d). This model seeks to offer an iterative cycle of broad considerations to support smart learning activities, particularly situated in

hyperlocal 'in the wild' urban locations (e.g. Carroll et al., 2017; Lister, 2020). The model orientates toward supporting participant experience variation, with pedagogical approach determined by nature of activity and types of participants for anticipated (or desired) experience variation and subsequent related pedagogical 'good fit'. Further considerations that arise from the aims, purpose and context of an activity can be acknowledged in terms of motivational structures and epistemological concerns that may be relevant to cultural or related aspects of place, context and participants.

In following sections I describe how the PECSL might be applied for scoping the design of a smart learning activity to plan for experience variation and related pedagogical considerations. I attempt to show how the PECSL model is used in practical terms, using examples of different types of activity to illustrate relevant PECSL considerations. Smart learning in outside location real-world scenarios requires flexibility to support the hybridity and multiple kinds of interactivity for potential learning in different activity types and participant groups. The learning activity examples discussed here (inspired by existing activities) can act as illustrations of the potential for pedagogical approaches and strategies that could be incorporated into learning designs of similar activities.

Four imagined learning activities based on existing activities are scoped to indicate the four tiers of PECSL. In each case a brief outline of a practical and pedagogical scope and an experience relevance scope are offered. This is then followed by a summary of indicators for how PECSL tiers relate to the activity for relevant considerations. Each activity is distinct, explicitly titled and described. Learning activity examples outlined here are inspired by the Tokyo Paper Hunt, the Wood Street Walls community art initiative, Ambient literature projects and the concept of Dérive. These activities are re-imagined for learning, using the PECSL model to plan and scope experience variation and subsequent pedagogical approach. Beginning by scoping core practical and pedagogical considerations (Lister, 2021d) and planning for experience variation by scoping activity experience relevance provides the initial strategy for the activity. Related pedagogies are then selected depending on nature of activity and desired experience variation. These indicate further potential pedagogical relevance structures and epistemological aspects that may impact participants in the context of their learning environment and beyond. This attempts to demonstrate in simple terms how PECSL considerations might contribute to useful scoping and decision-making in designing these kinds of activities for smarter learning, for purpose, aims and further context (Lister, 2021d, p. 6–8).

A Paper Hunt in Tokyo

A Paper Hunt in Tokyo[6] was an activity created in 2017 by Alex Evan using What3-Words[7] three word addresses to map a trail of bookshops, stationers and art supply stores in Tokyo. This activity offers a source of simple ideas for reading, writing and associated literary activities in connection with places, maps and discovery. I have scoped an activity here for developing critical analysis of reading and reflection, related to places. Participants might be 14–16 age group, participating in groups.

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[6]Tokyo Paper Hunt http://www.wapapum.com/a-paper-hunt-in-tokyo/ and https://what3words.com/news/general/3-word-address-paper-hunt-around-tokyo/
[7]What3Words app https://what3words.com

Reading hunt: developing critical analysis for reading and reflection

Practical and pedagogical scope

- The purpose and aim of the activity is to visit several locations for reading set texts on a chosen topic in situ, e.g. historical and cultural relationships of places and features in place.
- Finding related locations and features via What3Words addresses, perhaps supplemented by a custom digital map.
- To reflect on the texts while in the location, and discuss aspects of the location in relation to the content with co-learners. Write down reflections, take photos. Written reflections could be done individually or in groups, shared into a learning app or in social media.
- The general context would be aspects such as travelling the city, specific locations, the participant group, collaborative aspects of tasks and further cultural dimensions depending on place and topic.

Scope the experience relevance plan

- Experience variation emphasis is on relationship of tasks to wider relevance within related discussion, asking about how set texts relate to location, and why.
- Further expand to prompt for other related experiences learners have that they feel are relevant to the topic of reading in the context of the places, comparing texts with each other (for aspects of place, text and cultural settings).
- Probe what else is notable for learners in places visited and texts, for related anecdotes, emotional and mood reactions.

PECSL tier considerations

- *Experience Relevance:* Emphasis of experience variation for depth and complexity is on tasks and discussion of tasks, leading to further experience of knowledge and place as value.
- *Related pedagogies:* The activity is scoped for inquiry-based and dialogic learning, with potential for gamification and discovery learning. Emphasis is on reading, evaluating and dialogic reflection. Discussion is of read pieces, aspects of the discovery journey, related observations and recollections.
- *Pedagogical relevance structures and epistemological context:* emerging from emphasis placed on different aspects of experience variation in relation to locations, topic and tasks:
  - Consideration of individual and group motivation and engagement through tasks.
  - Social and digital interactions for participation and the role of (social) construction of meaning making relating to readings and location contexts.
  - Cultural dimensions of content and place for learners.

Wood Street Walls

Wood Street Walls is a community initiative to support local artists in Hackney, London, UK. Artists support the local community by running workshops and tuition in various arts, and a by-product of local artist representation in the area is to produce

street art, brightening up commercial and industrial spaces for local businesses and civic amenities. A feature was set up to help local residents find local art works in a playground[8] using What3Words. This kind of activity offers a source of ideas for ways to utilise localised visual culture for learning. I have scoped an activity using a creative learner-directed approach, aimed at new immigrant residents to learn about their local area.

Exploring local street art: developing community identity with local creativity

Practical and pedagogical scope
- The purpose of the activity might be to learn about local surroundings and create an image trail using photography and the 3WordPhoto[9] app. To then reflect on the content the participant is creating and sharing, relating to the local art they were finding and mapping, and write short pieces about each shared 3WordPhoto image on a community Twitter feed.
- Location, setting, atmosphere, mood could be prompt topics, relating to belonging, identity and community.
- The context would be discovering the locations, and relating the street art to learner's own creative capturing of it in situ.

Scope the experience relevance plan
- Experience variation emphasis is on being there at the place and how aspects of features found are interpreted to create new reflections on identity and ideas about different cultural interpretations of place.
- Further expand to deeper reflections on value and significance of new local identity and relationships to past recollections or experiences.
- Acknowledging the places that are visited, the photographs and reflections being captured, what moods are evoked? What might be problematic, challenging or significant?

PECSL tier considerations
- *Experience Relevance:* Emphasis of experience variation for depth and complexity is on being there and knowledge and place as value, by creating content in specific locations and reflecting on its value in situ, and in wider contexts.
- *Related pedagogies:* The activity is scoped as creative self-directed learning, with aspects of discovery, exploration and reflection being significant. Place-based learning inter-relates with creative participation.
- *Pedagogical relevance structures and epistemological context:* emerging from emphasis of experience variation on place and creating knowledge in relation to place of value to the learner:
    - Consideration of individual motivation to be creative, to reflect on identifying with place for capturing visual representations of the locality, and significance to them.

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[8]Wood Street Walls using What3Words app https://youtu.be/O-lhbhfibDI
[9]3wordphoto app https://www.techradar.com/uk/news/navigate-with-imagery-thanks-to-3wordphoto

– Further context is cultural identity of local populations and feelings toward aspects of this.
– Further aspects of self-realisation in ideas about identity and belonging.
– Digital interactions for participation and meaning making: digital content creation skills, media and digital literacy for image contexts.
– Cultural dimensions of creating content in a new location and space, interpretations of past and present cultural contrasts.

Ambient literature

"(A)mbient literature is a mode of literary engagement in which the literary text is brought into contact with the situated context of the reader through the use of digital information communication technology" Marcinkowski (2016). As such, forms of smart learning in urbanised connected hyperlocal places may be well suited to concepts of ambient literature. Ambient Literature revolves around fragments of narrative forming usually complete stories delivered via digital communication channels (Koehler, 2013). The role of place is significant, as "the reader is asked to also read situation and context … read text on the screen of a smartphone and listen to audio through headphones (and) read the physical environment around them, walk along city streets or experience the sights and sounds of a single location" (Spencer, 2017). These kinds of activities are rich in possibilities of repurposing for learning, here I scope an activity for collaborative writing in place, perhaps aimed at youth club groups, or a community group organisation for a particular topic.

Ambient literature: writing in place

Practical and pedagogical scope
– The purpose of the activity would be a group activity to collaborate on writing sections of a narrative, located at different planned points along a route.
– Apps suitable for this might be What3Words addresses connecting with Twitter posts.
– Topics of stories, imagination, location features and settings, atmosphere, mood could all prompt discussion and creativity.
– The context would be planning and mapping the locations, making connections between mood, narrative, cultural aspects, evoking emotion in located context.

Scope the experience relevance plan
– Experience variation emphasis is on place and being there, how place affects writing and narrative, experiences of relevance of place to wider related contexts. Discussing becomes relevant because of collaboration.
– Expands to deeper reflections on relationship between knowledge (writing and narrative in this case) and place as of value, why information or creative content in place may offer further significance or additional meanings.
– Probe places selected for narrative locations and the reasoning behind choices, what moods are evoked, what is significant? What lies at the periphery of these place sensations?

PECSL tier considerations

– *Experience Relevance:* Emphasis of experience variation for depth and complexity is on place and being there. Knowledge and place as value, through discussing and creating narrative content in group collaboration.

– *Related pedagogies:* The activity is scoped to emphasise writing in place using creative place-based learning as a group activity for writing sections of story with a pre-planned route of places. Dialogic learning inter-relates for recollections or reflections on route and places for reasoning of place in narrative and storytelling.

– *Pedagogical relevance structures and epistemological context:* in this activity emphasis of experience variation is on place and creating knowledge in relation to place of value:

  – Consideration of group collaborative factors of motivation to be creative, deciding roles of members of the group.

  – Reflect on ideas for narratives and places, significance, mood, reasoning.

  – Context of locations and cultural impact on creating narrative.

  – Digital creative interactions for participation and meaning making.

  – Cultural dimensions of discussing storylines in place and related to place, with a group.

Dérive

Dérive[10] is the practice of discovering unknown urban localities. This idea has recently been somewhat re-interpreted for the digital era as Algorithmic Psychogeography,[11] further explored in Pinder (2005). Bob and Roberta Smith, Associate Professor in Fine Art at London Metropolitan University, has utilised this approach to encourage creative student-directed collaborative interdisciplinarity between different schools at the university. Utilising a dérive inspired activity, participants were asked to adventure into areas of East London in a randomly instructed way, essentially borrowing ideas from both himself (Rogers, 2015) and earlier recent practitioners in the field of unknown exploration (Kazil & Hoe je Bek, 2010). This kind of activity can be repurposed for any number of creatively inspired topics and ideas for learning. Here I scope an activity for individual or group participants to create a smart exploration journey using Google Lens[12] and What3Words to map found locations using random exploration techniques.

Dérive, creating a smart exploration journey

Practical and pedagogical scope

– The purpose of the activity would be for an individual or group to create a smart exploration journey using Google Lens and What3Words to map the found locations. The aim would be to explore an area using an unpredicted technique such as 'turn left, turn left, turn right…'. Can be repurposed for researching locale.

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[10]Dérive: "a revolutionary strategy originally put forward in the 'Theory of the Dérive' (1956) by Guy Debord, a member at the time of the Letterist International". https://en.wikipedia.org/wiki/Dérive

[11]https://www.spacehijackers.org/html/ideas/writing/socialfiction.html

[12]Google Lens https://lens.google.com

   – Using Twitter or video apps can share aspects of location for created and *smart delivered* (links found with Google Lens sources) content, including photographs using 3WordPhoto, or using other relevant apps.[13]

   – Location features and settings, atmosphere, mood could all prompt creative imagination for ways of capturing found places.

   – The context is random technique exploration, mapping found places, mood, cultural aspects, evoking emotion in unplanned discovery.

Scope the experience relevance plan

   – Experience variation emphasis is on knowledge and place as value as most significant. Being there as an unknown until it happens.

   – Experiences of relevance of being there to indicate what may be perceived as focused on, to represent the discovered, found location. Discussing, if in groups.

   – Deeper reflections on connections of knowledge and place (created and discovered content to represent found places) as of value, forming the mapped journey.

   – Moods evoked, what forms the central perception of each found place, what lies at the periphery of these places?

PECSL tier considerations

   – *Experience Relevance:* Emphasis of experience variation for depth and complexity is on knowledge and place as value. Being there is significant, as immediate impact, found, discovered. If working in groups, discussing found places and creating content to demonstrate their value.

   – *Related pedagogies:* The activity is scoped to be creative self-directed learning. Participant learners are discovering their own sense of exploration, how to document new, unpredictable sensations for information and mood, and note significant aspects as felt or known. This is immediate knowledge and place working together to create value. Aspects of dialogic learning may also be adopted for group work.

   – *Pedagogical relevance structures and epistemological context:* in this activity emphasis of experience variation is on creating knowledge (content) in relation to place of value:

      – Consideration for influential factors arising from random unpredicted discovery, for sense of implicit motivational significance and cultural impact.

      – Found places for significance: mood, what is perceived as representational - cultural, social, socio-economic, political, abstract.

      – Digital creative interactions for smart discovery of information and knowledge through apps, mapping techniques.

      – Prompts for discussion or reflection relating to emotional or other related past experience, associations of place, discovery, ambience.

Concluding comments on the PECSL in smart learning activity design The PECSL model is positioned to support scoping and planning smart learning activities through an iterative design and development process (Lister, 2021d). Inspired in part by

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[13]The Dérive app (https://deriveapp.com/s/v2/) might also be further investigated to digitally support learning in this type of activity.

Garrett's (2010) Five Elements of a User Experience, design for learning is from a learner-experience perspective, iteratively moving through stages of considerations as an activity concept is scoped and developed. Stages of development mean that considerations can be revisited and revised to further reflect on decisions for design of activity. The model is not an instructional step-by-step design manual, rather, just as Garrett's Five Elements are intended to prompt and probe for issues and impact in design thinking and planning, so the PECSL is also a 'thinking and planning' considerations model.

A note on personalised data and privacy Though outside the remit of this paper, a safe learning protocol (e.g. Huang et al., 2020) regarding ethical considerations for privacy and data collection should always be adopted for smart learning activity technological mediations, particularly in use of third party mobile apps and websites.

Validity, transferability and applicability of the PECSL

The following section offers reasoning for the validity, transferability and applicability of the findings of the research and the resulting PECSL model for potential use in other events and activities.

The findings of the research previously summarised that subsequently formed the PECSL model act as a snapshot in time (e.g. Trigwell, 2000, p. 81; Åkerlind et al., 2005, p. 81) of how participants experienced a smart learning activity manifested as a real world journey. This snapshot informs thinking and reflection on areas of importance for design and development of smart learning activities, the PECSL being an attempt at defining pedagogical considerations founded in this participant experience. Three areas of validity can be nominated for phenomenographic research (Booth, 1992), as content-related, methodological and communicative related validity:

- *Content-related validity* requires that research is grounded on a sound understanding of the subject content, that "the researcher must understand and identify with the topic which is at the heart of the study" (Booth, 1992, pp. 65–66). Collier-Reed et al. (2009) define this as "a researcher having a comprehensive grasp, or understanding, of topics related to the phenomenon under investigation", (2009, p. 7). The researcher (the author) has prior understanding and past experience of location and mobile based technologies and activities, including user analysis and needs elicitations for design and development of websites and novel apps, some based in educational settings.
- *Methodological validity* is determined by suitability of research design, participant sampling and data gathering relevant to study goals, and that analysis is grounded in sound practice (Booth, 1992, p. 66). The study at the basis of the PECSL utilised suitable sample populations (tertiary level students) to examine participatory experience in smart learning activities, carrying out interviews in empathetic and responsive ways. Analysis was sensitive to concepts and understanding of the discovery of units of meaning from which the outcome space categories of description were derived.

– *Communicative validity* requires that conclusions are presented to the community they relate to in terms it can understand such that they recognise themselves in the world the study describes. In phenomenography this can be thought of as "the world in which the subjects of the research interact with the phenomena of interest to the study", (Booth, 1992, p 67). Here interpreted as the research participants, their reactions to experiencing the smart learning journey and the wider community that may be involved in smart learning activity development. Analysis and findings from the study were articulated in "thick, rich descriptions" (Cope, 2004; Creswell, 2009, p. 200; Mertens & McLaughlin, 2004, p. 107) to communicate findings (Lister, 2021b). These are summarised here and elsewhere (Lister, 2021a, 2021d).

The "transferability" (Lincoln & Guba, 1985, p. 297; Sin, 2010; Collier-Reed et al., 2009) of the research findings to apply in other situations, either the experience complexity categories of description themselves or the PECSL that arises out of them, can be thought of as venturing into the lifeworld of a participant in a smart learning journey, to establish whether relevance to another activity might be present. Collier-Reed et al. (2009) refer to this as drawing on the notion of the "applicability" of research outcomes (Collier-Reed et al., 2009, p. 3) and argue that the original enquirer cannot know to what their findings might be transferred and applied to, but that the appliers can and do (Collier-Reed et al., 2009, p. 4, citing Lincoln & Guba, 1985, p. 298). The emphasis on the original researcher is to provide sufficient detail and description to enable the reader to make a judgement between study and applied scenario, such that may support relevant interpretation for further transferable application in settings somewhat similar to those of this study.

The phenomenographic findings of the investigation contribute to a wider set of conclusions regarding the pedagogical considerations of the PECSL, informed directly by participant experience data, and as such are absorbed into a wider real-world interpretation. This paper has sought to develop ideas about real-world transferability and application to bring further communicative validity to the PECSL context.

Conclusions

This paper has sought to demonstrate the relevance and application of the Pedagogy of Experience Complexity for Smart Learning in practical real-world scenarios, using activity examples to apply pedagogical techniques and considerations to plan for different experience relevance in various types of activity. This is the second of three sequential papers reporting on different aspects of the same research. The first paper (Lister, 2021d) reported on what the PECSL is and how it came about. This paper has attempted to show the relationships of the PECSL considerations to achieve planning for experience variation and complexity in smart learning activities. The third paper in the sequence discusses conceptual ideas for measuring this kind of flexible learning using the PECSL in conjunction with learning taxonomy cognitive domain equivalences (Lister: Measuring learning that is hard to measure: using the PECSL model to assess implicit learning, in preparation).

The PECSL cannot claim to be a defining guide, as different researchers in smart learning may discover different aspects of significance depending on the nature and

areas of interest in their study. Every activity is different, every group of participants will have at least a modicum of difference between them and every set of hyperlocal locations may also create different experiences and meanings. However, while acknowledging these differences and potential limitations of transferability and applicability, the PECSL can offer a roadmap of considerations that might indicate some possible categories of experience relevance, useful related pedagogical approaches, pedagogical relevance structures and underlying epistemological foundations. Whilst these four areas of consideration serve to outline stages of thinking and planning, they are not intended as exclusive and definitive, rather might be illustrative of indicative concerns. It is logical to assume that as more smart learning activities might be investigated from the perspective of learner experience that additional categories of experience variation might emerge, or challenges to the initial PECSL interpretations.

Abbreviations
PECSL: Pedagogy of Experience Complexity for Smart Learning; UCD: User Centred Design

Author's contributions
This is a single author work. The author(s) read and approved the final manuscript.

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Availability of data and materials
Not applicable.

Declaration

Competing interests
The author declares no competing interests.

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