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Smart learning in the community: supporting citizen digital skills and literacies

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Abstract. This paper discusses how smart learning in urban environments can mediate citizen digital skills and competences learning initiatives supported by standards such as the European Commission citizen Digital Competences Framework [8], thus helping a broad range of urban populations to gain essential knowledge and skills for navigating the digitised services of the societal urban systems around them. Smart learning, based on cultural, civic or community interests and placed within a context of ad-hoc urban learning experiences set in authentic learning hyper-local environments might support and develop citizen digital literacies and competences through a wide variety of informal learning activities. This kind of technologically mediated learning acts as an implicit conduit to channel the development of a number of skills and literacies involved in the use of digital apps and devices, and the manipulation of knowledge content both digitally created as well as consumed. Additionally, development of 'soft' skills such as community participation, confidence building and language literacy are increased in digitally connected spheres, enabling citizens to act with more self assured agency within these territories. The paper refers to the author's own doctoral research findings developed from a phenomenographic investigation into smart learning journeys to suggest a 'pedagogy of experience complexity' for smart learning as support for these kinds of learning activities.

Keywords: Smart Learning, Smart Pedagogy, Digital Skills, Phenomenography, Smart Cities

1 Introduction

As society moves towards realisation of a comprehensive digitisation, consideration must be given to the conditions of rapidly transforming technically mediated provision of urban society support systems, and the necessary digital literacies of citizens who are the intended users of those systems. In this context, this paper reflects on findings and further implications of doctoral research based at the University of Malta [35], in relation to conceptualisations for pragmatic application of a pedagogical approach to ad-hoc informal smart learning, to support digital skills, literacy and competences development for the digital citizenry of urban populations.

Focus is on emerging ideas of applying a smart learning pedagogical relevance structure [39 pp. 143, 202] formed as a 'Pedagogy of Experience Complexity' for

smart learning [35], derived from a phenomenographic investigation into smart learning conceptualised as smart learning journeys, with suggestions for ways to move forward in the support of developing the digital literacies of urban citizens.

Though there is now an almost ubiquitous digitisation of many of society's essential services, citizens remain unable to fully or even partially engage with these systems. Urban populations specifically may be at most risk of being 'left behind' [5, 26], and reasons for this are manifold, including language, culture, new migrant communities or others such as age and gender [37]. The challenges of engaging citizens in digitally mediated learning activities to support their digital skills development might therefore manifest in a variety of guises: limited digital device experience and knowledge; limited time available to participate; language literacy for reading or writing in an additional language; limited experience in aspects of information literacy to enable sourcing and selection of relevant useful information; limited confidence to participate digitally; or a mixture of several of these or other issues. Provision of community wide digitally mediated learning activities might therefore need to acknowledge the wide range of citizens they may be catering for, and be planned according to an inclusive, accessible and flexible design and development [54].

2 Defining terms and literature

Key terms are defined here within the context of relevant literature, and clarified into two groups: generic terms and more specific terms. It is acknowledged that many of these terms can mean more than one thing to different disciplines and discourses, so here context and meaning are described for this paper, referring to relevant literature to provide useful background.

2.1 Inclusivity, digital skills, literacies and informal learning

Generic terms used in this paper that may benefit from brief summary definition with examples from the literature would be inclusivity, digital skills, soft skills and literacies, and informal learning activities. Inclusivity here can be defined as pertaining to citizen involvement both in terms of the conceptualization and development of a smart city for all citizens and communities [3], and for how digital experiences, with any subsequent implicit or explicit technically mediated learning, are structured and created in those communities. Inclusivity is an important part of interpreting digital literacy, and in conjunction with closely related literacies of media and information, can be defined as being able to navigate and understand role, agency and potentials of these domains and territories, for example as outlined by Thompson [51]. Digital skills are best defined here by the digital competence framework for citizens, also known as DigComp 2.1 [8], which is the most recently devised and widely adopted comprehensive set of factors involved in such a set of skills. Of particular note here is that Bloom's revised taxonomy [1] forms a part of the DigComp 2.1 framework, giving an indication of proficiency level in relation to cognitive domain.

Discourse around soft skills has circulated for some years and often forms part of '21st century skills', e.g. [2], [10] in [53] and [51]. Soft skills can be thought of here as life skills [2] that are transferrable [54]. These are variously described as communication, problem solving, teamwork, collaboration, critical thinking and so on, and part of the three literacies of information, media and digital. Informal learning is understood here in its most general form of non-assessed learning, as opposed to non-formal [59] or formal learning [46]. To illustrate context for this paper, Carroll et al. [9] describe "a sustainable process of informal learning about information technology - helping community organizations learn how to discover, understand, and respond to their own information technology needs" [9, p. 5]. Informal learning can be thought of as learning that happens implicitly as well as explicitly. For example, gamified community activities that are ostensibly for fun can have learning impact as a more covert agenda, e.g. [18, 21], supporting practice with mobile apps, creating digital identities or encouragement to contribute to community discussion and feedback on a particular issue via digital communication channels [9, 48].

2.2 Smart cities, learning, environments and urban hyper-localisation

Terms such as smart city, smart learning and smart learning environments, hyper-local environments, urbanised learning and smart learning pedagogies form the specialised scope of this paper. Beginning with the term 'smart city', Ojo et al. [44] offer a comprehensive literature analysis of concepts for a smart city, highlighting a city is smart when investments in human and social capital, traditional transport and modern (ICT) communication infrastructure fuel sustainable economic growth as being representative of much smart city design and approach. This is further supported by de Lange & de Waal [14] who state "… the notion of 'smart cities' often invoked in policy and design discourses […] is mainly understood as a series of infrastructures that must be managed as efficiently as possible." They go on to state that "(q)uestions about the role of digital media technologies in shaping the social fabric and built form of urban life are all the more urgent in the context of challenges posed by rapid urbanization" (ibid, p. 90). This supports a smart city as primarily concerned with building smart citizen spaces [3], placing emphasis on the people, e.g. [42], not (only) the technological implementations of such city spaces, e.g. [23].

Smart learning and environments are variously discussed in literature within two contrasting positions. The first is the idealised aim of a learning experience provided by sophisticated technological infrastructures and an assumption of personalisation driven by data interactions, for example [32] or [20], or, where focus is more emphasised on human and pedagogical aspects, such as [42] or [17]. Some of the literature outlines complex technological-pedagogical systems, for example [43] or [4]. In this paper the meaning of the term smart learning is summed up best by Liu et al., as "learning to do, learning to learn and learning to self-realisation" [34 p. 209]. Dron makes clear that much learning in a smart learning environment is "a complex con-

versational process that can and usually does lead to much that is of value beyond what is planned" [17, p. 3].

In considering smart city localised places, here it is helpful to use the term *hyper-local*, more commonly applied to news content as hyper-local media (in weblogs, for example). Hyper-local places and place-making articulate the very localised nature of often limited lifespan digital community experiences situated in very specific small local areas. Carroll et al. [9] state "(w)eb 2.0 infrastructures can be hyper-local. Mechanisms for geocoding allow information and interaction to be located in space […] within a geographically local area…" and "…the rapidly expanding ecology of Internet devices, notably smartphones and rich information infrastructures for geo-location…" means that "… members of a community may now upload, share, comment, and collaborate on information when and where it is of interest ". The author's own doctoral research conceptualises and develops 'smart learning journey' activities located around St Pauls in the City of London, UK, and then Republic Street in the centre of Valletta, Malta. A smart learning journey is defined here as a smart learning activity in geo-spatially relevant locations: forming a journey of several close by locations that are related to the topic of learning. These would be examples of hyper-local (smart) learning locations, very specific to a small area.

Sacré & De Visscher [47] shed light on ways to think of urbanised learning, stating "urban education is concerned with all forms of learning in the urban context", that "civic learning (is) an essential component of the city", and "(a) cultural understanding of civic learning…" is the "citizens' assemblage of the social, the material and the symbolic, as a kind of wayfinding in society". This is how urbanised learning is conceptualized in this paper, as urban space situated learning activities. Within these types of learning activities, as situated 'smart' urban spaces, we then consider the potential of smart learning pedagogies. Lorenzo & Gallon [36] have useful input, stating that "…digital transformation … generates a need for rethinking educative roles in the digital age", and "Smart Education Models will have to include social dimensions and collaborative approaches…" [36, pp. 52,53]. They stress student centred 'individual awareness': "(i)t is difficult to understand the personal mechanisms that incentivize engagement and motivation […]. Smart learning spaces can be a useful element in this personalized approach" (ibid, p. 54). Dron emphasizes the purpose of smart learning environments to learn and teach effectively, and how intrinsic and extrinsic motivations play a crucial role in any learning participation [17, p. 11]. Reasons for motivation are considered in this paper as part of a pedagogical 'structure of relevance' [39] for smart learning.

3 Global urbanization

The world's population is rapidly becoming ubiquitously urbanised. Consider the following quotes, first from 2007, The United Nations Fund for Population Activities:

"In 2008 the world reaches an invisible but momentous milestone for the first time in history and half its human population, three 3.3 billion people, will be living in urban areas. By 2030, this is expected to swell to almost 5,000,000,000. Many of the new urbanites will be poor. The future, the future of cities in developing countries, the future of humanity itself, all depend very much on decisions made now in preparation for this growth.", [56].

Then, the 2018 revision from the World Urbanisation Prospects:

"Globally, more people live in urban areas and in rural areas, with 55% of the worlds population residing in urban areas in 2018. In 1950, 30% of the worlds population was urban and by 2050, 68% of the worlds population is projected to be urban […] to ensure that the benefits of urbanisation are shared and that no one is left behind, policies to manage urban growth need to ensure access to infrastructure and social services for all, focusing on the needs of the urban poor and other vulnerable groups for housing, education, health care, decent work and a safe environment." [58].

These key quotes provide a clear message, that without adequate consideration and support for the most vulnerable in society, many members of urbanised populations risk being 'left behind' in the post digitised urban landscape. Much other relevant discourse is available on this problem, for example [5, 26].

4 The issue of digitalization

Brennen & Kreiss [6] refer to digitalization "as the way many domains of social life are restructured around digital communication and media infrastructures", and digitization refers to "the technical process of converting streams of analog information into digital bits of 1s and 0s", also stating that they are "interrelated, concepts". Here it is suggested that a digitized society is both meanings.

Digitalization of societal systems to support citizen urban life has become pervasive [57], creating for many an unfamiliar and difficult terrain to negotiate for access to civic infrastructures [37]. Many citizen user groups might be ill prepared for this changeover when important civic services move from face-to-face access to only digitised provision. The challenge then, is to find ways to support all citizens in society to enable them to access the services they need, are entitled to and enjoy the benefits of adequate digital skills and literacies [21]. In urban contexts these issues become more urgent, as populations require digital skills and awareness to participate in almost every aspect of life: jobs, housing, health, education and so on [18].

4.1 Digital citizen skills and competences

Studies show that those most vulnerable and 'at risk' of being left behind in a digitized society are lower income groups, lower educational achievers and women [37]. We need to design digital solutions to support development of digital skills and competences with consideration for these citizens groups, for issues of context as well as individual competence levels. Vasloo [54], provides practical guidance for digital skills design awareness using the DigComp 2.1 framework [8] and this approach can be acknowledged as pragmatic guidance in the scope of planning and development of 'in the wild' smart learning activities.

Industry reports stress the urgency for initiatives to develop digital skills and competences relevant or even vital to urban citizen life. For example, the Mckinsey Global Institute, in [7], indicate significant changes in almost every aspect of labour, emphasising the growth of the technically skilled workforce: "France expects a shortage of 80,000 workers in IT and electronics jobs by 2020 … there could be a shortfall of some 250,000 data scientists in the short term in the United States … 23 percent of the UK population, or 12.6 million people, lacked basic digital skills, at a time when about 90 percent of new jobs require them". Need for digital skills extends beyond work, for example "(a) study of a South African SMS platform for reporting water and sanitation grievances found that although elderly, disabled, and infirm individuals in a township faced significant barriers in accessing water and sanitation services, they also lacked the technical capacities to communicate their issues via mobile devices, thus preventing their participation", [26]. But in devising initiatives to support development of citizen digital skills, measurable aims and outcomes should ideally be in place to ensure effective skills improvement. Utilizing existing digital skills frameworks, perhaps along with a flexible pedagogical guide, might provide measurable outcomes.

4.2 Digital skills and literacy frameworks

Three related current digital competence frameworks are briefly outlined here. Though frameworks often have similarities, the DigComp 2.1 [8] is useful as incorporates a cognitive domain using Bloom's revised taxonomy [1]. This permits a direct relationship with the author's proposed pedagogy of experience complexity [35]. Included for historical reference is Dede [13], who examines several frameworks in relation to the P21 initiative for 21st century skills for the period 2003-2010.

The Digital Competence Framework for Citizens (DigComp 2.1) 2018. The DigComp 2.1 contains five competences and eight proficiency levels for different purposes and skill levels, with examples of how to apply them. Along with practical ideas is a cognitive domain scale that matches skills and competences to Bloom's revised taxonomy [1], to help provide a learning measurement and pedagogical approach. It is therefore more possible to devise pedagogically based learning experiences that might support specific activities and develop particular aspects of digital skills.

A Global Framework of Reference on Digital Literacy Skills for Indicator (SDG) 4.4.2. Developed by the Unesco Global Alliance to Monitor Learning, their website [41] explains: "(t)o offer a more comprehensive view of the digital skills of youth and adults, […] the first step has been to develop a global framework of digital literacy skills based on a technical review of more than 40 digital literacy frameworks used by countries around the world." Essentially closely related to the competences of the DigComp framework this adds 'career competences' composed of soft, transversal skills as a sixth category [33].
The National Standards for Essential Digital Skills. Produced by the UK Department for Education (2019), again has generally similar categories of competences, adding 'transacting', the use of online services and buying securely online, as a separate category. The idea of the framework is to contribute to awarding qualifications in digital skills, beginning in April 2020 [16].

Worth further consideration, Dede [13] uses the 2006 'Partnership for 21st Century Skills Framework' (P21) as a benchmark to evaluate six other frameworks of the period. The P21 has six categories incorporating much of what is included in the more recent frameworks listed here. A clear development timeline seems evident from reading Dede's work.

5 Research context

A pedagogical relevance structure for smart learning is being developed by the author, derived from doctoral research at the University of Malta into smart learning journeys. This will form the foundation of a 'pedagogy of experience complexity' based in participatory connectivist-inspired pedagogical approaches. Here discussion is focused on implications relating to this pedagogical guide. The research is outlined in brief in the following paragraphs. To reiterate, smart learning in this research was conceptualized as a smart learning journey, that is, a smart learning activity in geospatially relevant locations: forming a journey of several close by locations that are related to the topic of learning and mediated by technology.

5.1 Methodology and research design

The experience of learners participating in smart learning journeys was the focus of interest in the research, and phenomenography was selected as most suitable. Two relevant fields of inquiry demonstrate the benefit of phenomenography as a methodological approach: technology enhanced learning (e.g. [50, 12]), and user experience (e.g. [30, 60]). These fields have increasingly looked to phenomenography to understand more about what users or learners do and why they do it. Phenomenography analyses learner experience, looking for experience variation at a collective rather than individual level, though context is retained. Phenomenography draws on Gurwitsch's [24] ideas about theme, thematic field and margin to analyse experience using a 'structure of awareness' analytical framework [11]. Known as a second order

perspective [38], phenomenography is non-dualist 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" [28]. Here we are not concerned with ontological discussions of reality, or of the essence of a phenomenon [39, p. 117], but rather only the reality concerning phenomena of interest to the research as experienced by the individuals being researched.

The sample was purposive and convenience [50, p. 4], recruiting 24 undergraduate and postgraduate participants on a voluntary basis, including cohorts from several education-related degrees based at University of Malta, and an additional cohort from London Metropolitan University studying English Literature and Creative Writing.

5.2 Smart learning in this study

Within a connectivist inspired [35] scope, HP Reveal[1], Edmodo[2] and Google MyMaps[3] were used to mediate learning interactions and a route of locations that together formed the smart learning journey. Employing digital augmented reality technology to augment specific features of locations, context-aware learning content, participative learning tasks and opportunity for location-based interactions were effectively provided to the learner at that time and place. Learning content was hyperlinked from knowledge sources such as Wikipedia[4], Wikimedia Commons[5] or specialist websites, with some content created by tutors and hosted on independent webpages[6].

Two smart learning journeys were developed, 'Literary London', approximately 2.5km, around St Paul's Cathedral and the City of London, UK, and 'Malta Democracy', approximately 600m, along Republic Street, Valletta, Malta. Both locations are rich in cultural history and heritage, providing multiple authentic sites for learning experiences and offering learners a creative and critical participation within an autonomous learning activity. This attempts to support Dron, who "consider(s) smartness as an emergent consequence of dynamic interactions between the environment's constituent parts, including those of its human inhabitants and the artefacts and structures they wittingly or unwittingly create." [17, p. 3].

5.3 Discovering a pedagogy of experience complexity for smart learning

Four categories of learner experience variation, defined as a phenomenographic outcome space [39, p. 136] for experiencing a smart learning journey were discovered. This resulted in a table of experience complexity for a smart learning journey,

[1] HP Reveal (formerly Aurasma) https://www.hpreveal.com/
[2] Edmodo https://www.edmodo.com/
[3] Google MyMaps https://www.google.co.uk/maps/d/u/0/
[4] Wikipedia https://www.wikipedia.org/
[5] Wikimedia Commons https://commons.wikimedia.org/
[6] Smart Learning research website http://smartlearning.netfarms.eu/

comprising the four categories, with four levels of complexity for each category [35]. Categories were 'Tasks and Obligations, Discussing (and collaborating), Being There and Knowledge and Place as Value. These categories potentially indicate that learners might be considered within a pedagogical relevance structure [39, pp. 143, 202] to support different aspects of experience complexity, in addition to any desired specific topic learning outcomes. Experience complexity understanding means that aspects of experience can be supported in multiple ways. A 'pedagogy of experience complexity' for smart learning [35] that the author is developing may provide a pragmatic way of understanding how for example the DigComp 2.1 might be applied to citizen smart learning journey activities for activity design and digital skills development approach. This pragmatic pedagogical guide draws on concepts from connectivist style participatory pedagogies [49, p. 10], as "communication skills, participation, networking, sharing – overlap with what are viewed as essential 21st-century learning and employability skills", [40]. Levels of surface to deep learning reflected in use of Blooms revised taxonomy [1] and articulated by work in for example [27] assist in outlining a pedagogical relevance structure applied to the four categories and levels of complexity of each. Table 1 shows category experience variation and complexity that forms the basis for the 'pedagogy of experience complexity' reasoning.

Table 1 Illustration of experience complexity for a smart learning journey pedagogical relevance structure.

	Category A **Tasks, Obligations**	Category B **Discussing**	Category C **Being There**	Category D **Knowledge & place as value**
Level 4	Research tasks and topic beforehand, take time doing and reflecting on tasks	Share tasks, 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, seeing knowledge and place as valuable, personal experience, deeper engagement, 'possibilities'
Level 3	Tasks indirectly related to coursework or assessment	Discuss tasks and topic in relation to time and place	Experience place relating to other people, aspects, memories, 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	Go to locations, do tasks, go	No engagement with content or

		technology works	home	knowledge, don't create or upload content
Notes on pedagogical structure of relevance	About tasks and assessment. Relevance of activity to coursework or purposes, assessment, further usefulness	About discussion and collaboration. Considerations concern how to expand participation to include the 'dialogic space'	About being in the place, support by showing learner how to engage in the place, with specific indicators and clues or prompts	About value of knowledge in the place, specified by location, time and relevance to other categories. Applying, creating knowledge bound by place with value.

6 Compiling the citizen learning city

Thinking about the potential for these kinds of urban situated learning activities described as smart learning journeys, we can consider possibilities for engaging citizens in cultural or community real worlds activities, and in so doing, develop their digital skills to support engagement with key civic services. Five relevant initiatives are provided here as examples. Community organisation, research based projects as well as personal activity concepts are highlighted. Projects discussed serve to illustrate how citizen digital skills and literacies could be supported and developed through engagement and participation, potentially enhanced by a pedagogical approach. Purposes of projects vary from creative, artistic and narrative driven to cause and issue related. What each project has in common is that it is situated within an urban environment and makes use of simple to use yet sophisticated technology to build community engagement. The common subtext is that digital skills are developed, and digital, media and information literacies are expanded and explored for those who participate in these activities.

6.1 Participatory creative activities and mapping the city

Mapping the city has a long tradition, for example "urban geographer Kevin Lynch uses the term 'wayfinding' to describe the process of navigating through the 'vast sprawl of our cities'…" [29]. Mapping has been absorbed into smart city cultural communication perhaps partially through use of wayfinding and alert apps such as ThunderMaps (now SaferMe)[7] or Waze[8]. Mapping content to geo-tagged locations has steadily become part of urbanised digital interaction, for example apps such as DB Pedia Places[9] or Geoflow[10] display local content geo-tagged to a GPS smartphone

[7] ThunderMaps, now known as SaferMe, https://play.google.com/store/apps/details?id=com.thundermaps.saferme&hl=en_GB
[8] Waze https://www.waze.com/en-GB/
[9] DBPedia Places https://wiki.dbpedia.org/project-categories/user-applications
[10] Geoflow app https://apps.apple.com/us/app/geoflow-learn-something/id1235949045

location. Projects outlined here either use specific bespoke smartphone apps, sometimes in conjunction with websites, or free smartphone apps.

Community maps in Hackney Wick[11]. Community mapping in the Hackney Wick area of East London, UK, records places of interest or concern and is created by residents for residents. A map is developed showing hyper-local points of interest, features or issues and information is attached to each map pin.
Map Local[12]. Map Local was a Birmingham based research project for urban planning, with input from 50 selected residents in specific areas of Birmingham. The project sought to 'unlock the creativity of communities by gathering materials to inform neighbourhood planning'. A bespoke app, 'MapLocal' allowed people to create audio and image content on smartphones that was uploaded to a map on the MapLocal website.
Wood Street Walls[13]. Wood Street Walls is an artist's collective based in East London, UK, and orientates towards encouraging local involvement of the community in arts activities as well as providing affordable studio space for local artists. Wood Street Walls use What3Words[14] and 3WordPhoto[15] as an innovative way to discover local street-art created by these artists and others in the community. The apps are used to document the work available and help to brighten up the community and engage citizens in aspects of urban space ownership.
Tokyo Paper Hunt[16]. The Tokyo paper hunt case study available on the What3Words website outlines a knowledge hunt activity using What3Words, for finding a series of bookshops amongst the complex Tokyo address structure. This kind of concept could be repurposed for many kinds of activities, using maps to find things and then perhaps record further input as a result of finding the locations.
Smart Learning Feedback Maps[17]. Smart Learning Feedback Maps are an outcome of the author's research, being a concept investigated as a solution to participant feedback for the smart learning journeys developed for the research. Feedback could be generated by participants while at locations on a smart learning journey, and pinned to map coordinates from where they submitted the feedback, adding text and images. This would give future participants an idea of what to expect and over time develop a rich source of community generated informal knowledge about smart learning journey activities in the area.

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[11] Community mapping in Hackney Wick, London, UK https://communitymaps.org.uk/project/hackney-wick?center=51.5443:-0.0340:15
[12] Map Local project available at https://chrisspeed.net/?p=1303
[13] Wood Street Walls Community Art project uses What3Words https://www.youtube.com/watch?v=O-lhbhfibDI
[14] What3Words https://what3words.com/
[15] 3WordPhoto app and other what3words photography integration https://what3words.com/products/?category=Photography
[16] Tokyo Paper Hunt with What3Words https://what3words.com/news/general/3-word-address-paper-hunt-around-tokyo/
[17] Smart learning feedback maps webpage demonstration http://smartlearning.netfarms.eu/scl-learner-feedback-map/

In addition to these examples, the Planetizen[18] website contains numerous other examples of social, civic and more high profile arts projects and apps, and is shared here for information to encourage the reader to investigate these ideas further.

7 Implications and significance of this paper

The scope for this kind of smart learning activity offers opportunity for learning that can be both overt (for example arts, environment, or cultural appreciation), and covert (digital skills and competences). That is, in addition to entertainment, civic support or community engagement, digital skills and competences, together with their associated soft skills, can be developed as implicit learning.

Framing smart learning as conceptualised in autonomous smart learning journeys, and utilising both a digital skills framework such as the DigComp 2.1 (or partials of it) and a pedagogy of experience complexity (or aspects of it) may provide engaging practical mechanisms to support citizen digital skills and competences in flexible alternative ways to the more common 'computer training sessions' approach. Digital skills are often not perceived as being limited by a user themselves, e.g. [45], therefore citizens may not be inclined to attend such training courses. Perhaps gamifiying [22] or similar approaches to digital skills development introduces a more attractive option, placing digital skills development in a covert learning strategy. Learning happens without learners even being aware of it.

8 Conclusions

The research sought to develop a pragmatic fluid pedagogy for smart learning by using smart learning journeys as a simple model of activity, and in so doing highlighted the creative, social and participatory nature of these activities, perhaps demonstrating the potential for ad hoc 'in the wild' urban community engagement that might benefit from these kinds of activities. Further to that realisation was a significant implicit aspect of these kinds of activities, the learner experience of digital tools and functionalities. The process of uncovering how to use apps and platforms was an aspect of learning that itself offered value, indicating that within informal citizen digital skills and competences development contexts this value might be a significant aim and reason for any journey being developed.

[18] Planetizen examples of relevant apps and projects: https://www.planetizen.com/news/2019/05/104255-neighborhood-based-apps-and-socialized-fear-crime; https://www.planetizen.com/news/2019/08/105653-augmented-reality-and-public-art-new-era-begins-today; *Can Technology Help Involve More Low-Income Residents in the Planning Process* https://www.planetizen.com/node/60880.

Jordon [29] emphasises the importance of participation in the urban environment. His quote from the UK Department of Business, Innovation and Skills sums it up: "… a Smart City should enable every citizen to engage with all the services on offer, public as well as private, in a way best suited to his or her needs. It brings together hard infrastructure, social capital including local skills and community institutions, and (digital) technologies", [15]. If we want all citizens to engage in urban life, we need to find better, easier ways for them to develop their digital skills and competences. Perhaps informal smart learning journeys supported by a framework of digital competences and a flexible pedagogical approach can be part of that effort.

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