Game-based Networked Learning

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Abstract

Designing and analyzing learning experiences in non-formal contexts can be challenging, even for those with educational training. The challenge is more significant if the priorities include educational ideological bases or an specific type of educational vision. The DALI project (Data Literacy for Citizens) has the primary goal of offering Data Literacy learning experiences specifically designed for adults in non-formal educational contexts. With this goal in mind, and considering the social and material realities of the target participants –their needs, diversity, interests and cultures– the project combines two of the most promising pedagogical approaches nowadays: networked learning and playful learning.

This short paper outlines the pedagogical vision underpinning our efforts to integrate both approaches into a set of strategies and resources, in other words, the principles and ideas driving the design of what is called in the project: Game-based Networked Learning (GBNL) experiences. In particular, we draw on both the Activity Centred Analysis and Design (ACAD) framework and the Transdisciplinary Model for Developing Game-Based Interventions. After reviewing key aspects of the theoretical grounds that define our understanding of educational uses of technology and game-based learning, the paper addresses critical considerations underpinning the adaptation of the ACAD framework in the planning of playful learning experiences. Thus, the paper outlines the main principles guiding the design of DALI experiences, dividing them into the three design areas established by ACAD: set design, epistemic design and social design.

The ambition of this approach is to serve as a pedagogical and educational statement to guide valuable actions to improve other adult learning approaches.

Keywords

Activity Centred Analysis and Design (ACAD); Networked Learning; Connected Learning; Playful Learning; Game-based Learning

Research context and justifying

This paper presents an innovative approach that combines principles of both playful learning and networked learning with the aim of fostering the development of adults' Data Literacy in non-formal learning contexts. Devised as part of the Data Literacy for Citizens (DALI) Erasmus + project (Strategic Partnership 2020-1-NO01-KA204-076492), the approach will inform the design of a set of flexible pedagogical strategies and resources devised to facilitate Game-based Networked Learning (GBNL) experiences, to be piloted in 2022 across diverse populations in four countries (Germany, Norway, Spain and the UK).

This work starts start from the conviction that learning design is not just a technical task of connecting educational objectives with a teaching-learning situation and, therefore, is far away from being neutral. It entails defining the aspects that must be designed for every learning startegy, as well as the educational features to be followed when designing the learning situations in order to foster specific educational approaches and goals. Additionally, supporting the development of Data Literacy, in the case of this project specifically for adults, requires to build an educational proposal based on up-to-date knowledge as defined by an emegent and rapidly evolving field of expertise. Therefore, this paper aims to define the pedagogical ideas that will be considered during the designing of our GBNLS, taking into account the main designing areas, as well as the educational principles that will guide them.

Theoretical perspectives

Learning and Technology

Our approach is underpinned by the principles of networked learning (NL), which means we understand the development of competencies as an emergent activity aimed at "foregrounding learner agency", where expansive learning, reflexivity, and a shared commitment among participants bring about a "distinctive dynamic potential" (Networked Learning Editorial Collective (NLEC), 2020, p. 30). More specifically, it adopts the Activity Centred Analysis and Design (ACAD) framework (Goodyear et al., 2021) to organise the design components in the most straightforward and most precise possible way while enabling the design of resources to deliver complex learning experiences. Likewise, the approach draws on the principles of Connected Learning (CL) to inform the creation of new spaces where learning happens, helping learners to connect with people and communities with the same interests by means of "openly networked infrastructures" (Ito et al., 2020, p. 43). Learning experiences are conceived taking into account the social and material realities of target participants, considering their needs, interests and cultures (Ito et al., 2020). They are approached as situated experiences that provide an "infrastructure for shared critique, inquiry and the ongoing design of new tasks, technologies, resources and relationships" (Networked Learning Editorial Collective (NLEC), 2020, p. 10).
Working together (i.e. the social dimension of learning) is crucial to both NL and CL. Human relationships are the main basis of these approaches, which include "trust, power, identity, belonging, difference, affection, reciprocity, solidarity, commitment and time", not just as a strategy (Networked Learning Editorial Collective (NLEC), 2020, p. 3), but as learning subjects themselves.

Playful and game-based learning

Games are valuable means through which play can be observed and facilitated in a structured way, which can lead to purposeful and meaningful engagement and actionable feedback. Upton (2015) suggests that "the use of games is a good starting point for an investigation of play because the formality of their rules makes the machinery of play easier to observe and analyse", where "games are a particular manifestation of play, not its totality" (p. 11). Following Whitton (2018) and Tekinbaş & Zimmerman (2003), there are at least three main aspects regarding the use of games that are particularly relevant to the non-formal adult-learning contexts where DALI operates:

- The active construction of failure and creating a learning environment in which learners feel that they can fail, which enable participants to overcome a potential lack of self-confidence, to immerse themselves in the spirit of the game and even to adopt a "crazy" (i.e. thinking out of the box) attitude.
- The immersion of learners in the game releases their imagination and fosters creativity. By engaging in a fictional world, they can address real life problems from a new perspective.
- Playfulness implies that activities are voluntary and intrinsically motivating; participants enter and shape the rules, actions, and boundaries of the game space through choices (the first one being to participate).

The general development process of an applied game should be iterative and participatory, as defined by game development life cycle –GDLC– (Ramadan & Widyani, 2013). For applied games, the added complexity is in balancing both entertainment (engagement) and the serious outcomes (learning, impact). In particular, the playful learning dimension of DALI will be directly informed by the 'Transdisciplinary Model for Developing Game-Based Interventions' (Arnab, 2020).
The gaming experience is already in itself a compelling context for learning and reflection (Arnab et al., 2019; Postigo Fuentes, 2021). It is not the games themselves that are powerful, but the pedagogical transformation –in formal and non-formal contexts– and learning that can occur as a result of using games in a meaningful way.

ACAD for playful learning experiences

Structured using the ACAD framework (Goodyear et al., 2021), the networked learning experiences devised as part of DALI will follow a simple structure allowing us to (at a minimum) situate them physically, socially and

epistemically. In the following sections of the paper, we will discuss the principles guiding the design of DALI experiences, dividing them into those three key design areas established by ACAD:

Set Design

The ACAD framework explicitly recognises that learning activities are physically situated, and the set design shapes the conditions of the space where learning takes place and the materials used to enable it. This part of the design highlights "(a) the influence of qualities of a place and (b) the way that physical things – such as tools and other kinds of artefacts - become woven into and affect activity" (Goodyear et al., 2021, p. 448). In the case of the GBNL experiences, the material conditions –games' objects and spaces– constitute the playful set design. Games resources-materials are assets that help the player to achieve their goals. Examples of resources could be lives, units, health, currency, actions, power-ups, inventory, special terrain and time. Other elements that help in the physical situation are boundaries, the premise, and the game's story (Fullerton, 2019). These resources and spaces can be completely fabricated, or they can be based on real-world objects. But even in those cases where they are based on familiar objects, they are only abstractions of those objects and still need to be defined in the rules as to their nature in the game (Fullerton, 2019).

The set design is about the tools and resources themselves and the differences in activities that emerge from the combination of those resources and places. We should consider the relationships between these elements because depending on how we combine them we will get a result or another, and all of that together creates a complex new whole. Therefore, the creation of the DALI experiences' set design should consider the importance of creating what Ito et al. called "openly networked infrastructures" (2020, p. 43) that help learners to connect with people and communities with the same interests; in this way, they create new spaces where learning happens.

Epistemic Design

When the ACAD framework defines the epistemic design, it refers to the kind of tasks designed for learners to do. This design remarks "(a) the role of knowledge-laden task specifications in giving students suggestions about directions in which to travel, and about good things to do on the way, and also (b) a recognition that students, as people, are always already doing several things, in which various forms of knowledge and ways of knowing play a part" (Goodyear et al., 2021, p. 448). Therefore, situated in a GBNL perspective, it is crucial to be precise on what the principles are that will guide this epistemic design in the DALI learning experiences. From the epistemic point of view, games may turn into effective learning tools mainly because they allow inquiry-based spaces in which challenges are levelled. Games can be engaging contexts for systems thinking, design thinking, communication, creativity and innovation (Gee, 2007), as they (either analogue or digital) help learners identify patterns, think about future moves, predict outcomes of possible moves and learn from experience. Through explicit and implicit feedback (Postigo-Fuentes, & Fernández Navas, 2020), games also help players understand their progress, what they need to work on, and where they need to go next (Institute of Play, 2015).

Both rules and conflicts lead to outcome, which is often uncertain, although, according to Fullerton (2019, p. 72), "there is the certainty of a measurable and unequal outcome of some kinda winner, a loser, etc.". Nonetheless, the aim of the play is to play, and it is in this playful space that learning is constructed. They do not need to have a practical value. They take something familiar and give it a novel twist—a good way of inviting you to be playful. That means that it does not need to be just appropriatelly challenging –not too easy, not too difficul– but also fun. However, the concept of "fun" in a game might be tricky. Fullerton (2019) summarises very well how to design a good puzzle by saying that you need to build first a good toy: the player should have fun just manipulating the puzzle, even before reaching a solution. We would add that, even if players do not "solve" the game, during the action, some learning should appear. However, it must be borne in mind that 'fun' and 'learning' will only emerge depending on the circumstances defining each time a game is played in a situated context.

The most important part of the epistemic design must be the one related to the task and the challenge presented—in this case, the content about DALI—. Some procedures, rules and conflicts are related to mere concepts while others might be related to objects (cards, figures) or to material conditions (spaces, backgrounds, boards); therefore, the epistemic and set design of the game as a pedagogical strategy should happen in parallel.

Social Design

The ACAD approach recognises that the learning activity is always 'socially situated', meaning that what learners actually do during a period of time in which they are expected to be learning something is substantially influenced by, among other important things, what the people around them are doing (Goodyear et al., 2021). Games are powerful student engagement and learning tools in classrooms (Hines, Jasny & Mervis, 2009), as they activate an iterative design process that is, by nature, collaborative and active—for trainers and learners–,

and we understand that this characteristic is extensible to less formal educational contexts, and one of the keys to the potential of the game is the interaction of the player with the environment and with other players.
The DALI approach is grounded on two main ideas about the social part of learning: (1) "learning is most robust when grounded in a learner's cultural identity, part of a meaningful inquiry, supported by caring relationships, and reinforced across settings" (Ito et al., 2020, p. 26), and (2) diverse cultures must be represented (Gourlay et al., 2021).
In addition, it is crucial to take into account that DALI is aimed at a highly diverse population of individuals, covering different age groups (young adults, general adults, seniors), socio-economic statuses (workers, students, unemployed, retired) and cultural backgrounds. Therefore, DALI pedagogical experiences must be "inclusive, ensuring that everyone can participate providing different ways for individuals and groups to contribute" (Ito et al., 2013).

Next steps

Based on this approach, the DALI project will develop some design strategies that help our team to carry on the design of the activities, as well as serve to other researchers and practitioners to approach Game-Based Learning from a Networked learning perspective.

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