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Transmedia learning: an opportunity for digital inclusive education

L'apprendimento transmediale: un'opportunità per l'educazione inclusiva digitale

Sezione Monografica

ABSTRACT

Born within the context of participatory culture and media convergence, transmedia learning is growing as a didactic proposal linked to storytelling that aims to mobilize and develop digital skills in interactive contexts. Through a systematic literature review (SLR), as a first step, we try to define the concept of transmedia learning, with socioconstructivist and connectivist roots. And, from there, we try to analyse its characteristics in terms of inclusive education, also from a gender perspective, to consider if transmedia learning can be an opportunity. Transmedia learning is flexible, customizable and personalizable from the didactical and technological points of view, so it is in line with the principles of accessibility and universal design for learning. And, for similar reasons, it can help us fight against the gender digital divide. Therefore, transmedia learning can be an opportunity for inclusive digital education

Keywords: digital divide; gender digital divide; inclusive education; media education; transmedia

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Introduction

There is no doubt that participation in all areas of the Knowledge Society in the, 21st century requires the mobilization of different digital literacies (van Dijk, 2017), and because of that media education has been responsible for highlighting in the context of the varied and wide-ranging reflections on digital competence, one of the key competences of citizenship in our time (Sánchez-Caballé et al., 2020). The risks of the different forms that digital divide can take undoubtedly threaten the empowerment of the people we serve in the education system of the Western world (physical gaps in access, competence and use, according to van Dijk (2017), especially in a society characterized by media convergence and participatory culture (Jenkins, 2006), in which participation means not only consuming, but also actively producing, contributing to a media and multidirectional cultural flow in which it is not only necessary to know how to read in digital, but also how to write, navigate and change across media. Education systems, such as those in Italy and Spain, for example, have essentially taken on two main strategic lines to meet this challenge: making children and adolescents literate (enabling them to develop the necessary levels of digital skills) and digitizing schools (providing them with technological resources and training teachers to introduce technologies into the teaching-learning processes (Gremigni, 2019; Ugolini, 2016). But digital divides continue to exist, partly because of their diversity, heterogeneity and the multiplicity of forms they take (van Dijk, 2017). And, among them, we must pay special attention to those divides which affect to students with special educational needs, in a context where guaranteeing digital education for everyone must go far from only allowing all students the access to technologies (Banes et al., 2019; Valadez & Durán, 2007) and education must cover, at least van Dijk's (2012) stages of ICT access (access motivation, physical and material access, digital skills and effective use, and complete and fruitful use), which leads us to consider educational accessibility in the broadest possible sense (Mazzer, 2018; Midoro, 2015). And we also must pay attention to the gender digital divide (Clark & Gorski, 2002, Acilar & Sæbø, 2021), which not only has repercussions on the low rates of female vocations in the scientific-technological field, but also perpetuates the differences between women and men, from childhood, also in terms of how they feel capable and skilled in the technological field or how we use technology in our personal and professional purposes. Despite the advances of the feminist movement, stubborn gender inequities continue to exist in all senses (access, availability of technological resources, digital fluency, and ability to practice meaningful use of digital resources) (Mariscal et al., 2019). And there is no doubt about the coexistence of other barriers (economic, socio-cultural, age) that affect the development of women and that even in the first world limit their educational opportunities (Perifanou and Economides, 2020), as different international organizations have been responsible for censuring with forcefulness (OECD, 2018; UNESCO, 2020). It is in this sense when we enter into the policies that should be carried out to reverse the situation and, among them, for example, we find the recommendation to implement educational actions that redesign learning experiences and that focus on empowering women for the future. And this is where different didactic approaches (perhaps transmedia learning) can lead us to offer educational opportunities that allow women an education for the future that considers a different and meaningful use of ICTs (Acilar and Sæbø, 2021).

Given all this, the principles of universal design for learning (UD-L) (Alba Pastor, 2016; Castro & Rodríguez, 2017; Rapp, 2014) can be part of the strategies we can use, as teachers, to fight against these divides, although a priori UD-L seems of unassumable proportions. The UD-L proposes that teachers, when planning learning activities, in general terms, comply with three main principles that are easy to state but not so easy to put into practice: offering multiple forms of representation, involvement and action. Although the UD-L philosophy is not strictly linked to the field of disability, but to inclusive education, there is no doubt that also in the field of formal education UD-L proposals with technology have been associated with this traditional view of special education (which, precisely, the UD-L wants to reverse) (Mangiatordi, 2017; Savia, 2015, 2018), with a clear commitment that links the use of digital technologies with access to the curriculum in the broad sense (Pieri, 2011) or with the necessary accessibility as a desirable property of technologies that should allow the transition to accessible and inclusive digital didactics (Avalle

et al., 2012; Blackall, 2007; Midoro, 2015). However, we still face two pending challenges: the design and implementation of real educational proposals that comply with UD-L principles (one fits all) and that, at the same time, allow not only the acquisition of the digital competences necessary for the, 21st century, but that can also contribute, at the same time, to dissolve or reduce the digital divide (including the gender divide) under an umbrella of inclusive education.

In these coordinates, we come to transmedia learning, a dazzling novelty in the digital educational literature that can bring together some important elements to respond to the challenge we have just discussed. We said earlier that the literature on media education in recent decades has focused on multimedia (how to take advantage of it from a didactic point of view, and how to make students competent from a multimedia point of view) in a complex and dynamic society (Esteban-Guitart, 2016; Gee, 2009, 2017; Jenkins et al., 2009). And, as we said, there is no doubt that in order to talk about all of this from a broad digital cultural concept, we must start with the concept of transmedia (Jenkins, 2006), which has also become widespread in the field of education. A concept of transmedia that has taken different forms, not always defined, such as transmedia learning, transmedia literacy, transmedia storytelling, among others.

The generalization of transmedia in the field of education is evident, which is already a cause for attention. For example, a quick search in the Google Scholar repository offers a good picture of its development (and of the growing interest, both in the general and educational domains) (searches carried out on 19/08/2021). Among the 40,600 documents returned by the search engine with the term transmedia, 5,600 include it in the title; and 3,240 are from the last five years. If we restrict the search to the educational domain («transmedia AND education»), among the 23,200 results returned by the search, 39 include the two keywords in the title, and 19 have been published in the last five years. On the other hand, we now turn to the concept of storytelling (although not all educational transmedia is, strictly speaking, storytelling; nor do all educational storytelling proposals necessarily have to be transmedia): of the 1,160,000 search results for this keyword, 72,800 contain it in the title, and 12,900 have been published in the last five years; and if we combine both terms («transmedia AND storytelling»), among the 22,600 results found, 388 include it in the title and 177 are documents published in the last five years of the last five years. These are just a few simple figures to show how transmedia is growing and growing in the field of education; and a good excuse to see what opportunities it offers us in terms of inclusive education.

Returning to the concept of transmedia in the field of education, we must consider two fundamental concepts of the cultural ecosystem coined by Jenkins (2006): media convergence and participatory culture. When speaking of media convergence according to this author, it is essential to take up the Matrix phenomenon, which gave rise to countless cultural productions of all kinds, commercial or non-commercial, in very different media and channels, analogue and digital; and, with this, we arrive at the concept of participatory culture, which allows us to emphasise the idea that these productions, of any kind and with any authorship, can only be understood as part of a heterogeneous flow; and in this flow, production and consumption alternate sequentially without an established, canonical order. We consume, but we also produce; we overlap media (multimedia) and we alternate them as well (and we also include analog media, not as an opposition, but as an alternative that is integrated into the media ecosystem). Consequently, citizens are no longer just passive receivers, but true prosumers (alternating between the roles of consumer and producer), and therefore need new media literacies, which are those that allow them to participate, and which place them at the center of the cultural process (Jenkins et al., 2009). If we take all these ideas to the field of education, we find approaches somewhere between constructivism and connectivism, closer to do it together (because of the community element) than to do it yourself.

Transmedia practices in general offer learning opportunities that challenge the boundaries between formal and informal learning (Scolari, 2016, 2018), as can be seen from the ethnographic analysis of the Transmedia Literacy project, which offers a new taxonomy of components of this transmedia literacy. Indeed, new ways of learning in the digital world emerge from this, and perhaps, for this reason, transmedia has an important echo, both from a general media perspective and from an educational perspective. In this sense, although all the contributions of the work of Scolari and his collaborators in the context of this

project are interesting and fundamental to understand how the complexity of media convergence takes shape in young people and adolescents, it is difficult to stop there. As we were saying, one of the major conclusions of Scolari (2016, 2018), as also emerges from a critical analysis of the work of Jenkins et al (2009) is that by participating in this new cultural environment one learns; but there is an important leap from that finding (revealing no doubt) to the implications of the didactic exploitation of the transmedia phenomenon in formal or informal educational contexts (that is, a deliberate search for learning by the teacher in the use of transmedia in educational contexts). Therefore, we must go a step further than Scolari (2018) if we want to take advantage of the full potential of transmedia learning. In general terms, the analysis of the different approaches to the concept from the educational field allows us to see transmedia as a media product, as a digital cultural phenomenon for which people need special literacy, or as a way of approaching the design of learning experiences (González-Martínez et al., 2018, 2019). And this is where we return to the beginning, as we find ourselves in a cultural context that allows us to propose learning experiences based on participation and cultural production in flexible (inclusive?) analog and digital contexts, which are not necessarily at the mercy of the borders between the formal and the informal of the adolescent educational world, and which allow the development of the digital competences necessary to make these personal learning projects grow: transmedia learning (Fleming, 2013; Raybourn, 2014).

Leaping into participation and production enables learning; perhaps the importance of this statement lies in its theoretical obviousness (not without practical complexity). However, what can we understand transmedia learning to be, what are its main characteristics? And, from there, what opportunities does it open up from the point of view of inclusive education?

Materials and methods

In this context, the aim of this systematic literature review is to address the conceptual background of transmedia educational practices. To this end, the aim is to provide an overview of the subject, mainly from the definition of transmedia learning and its potential from the point of view of inclusive education. Therefore, three research questions (RQ) are formulated for this study:

- RQ1. What is meant by transmedia learning?
- RQ2. What opportunities does transmedia learning offer from a general inclusive education (UD-L) perspective?
- RQ3. What opportunities does transmedia learning offer from a digital gender divide perspective?

To identify and analyze the most significant documents to answer the research questions, the systematic literature review (SLR) method was used. A SLR is a theory-building process whose main purpose is to review relevant sources in a specific area of knowledge by exploring information obtained from searches in different databases (Okoli & Schabram, 2010).

2.1 Process

To achieve an optimal, ethical and traceable search, the criteria defined in the PRISMA statement (Urrútia and Bonfill, 2010) of inclusion and exclusion, relevance, validity of studies, elimination of duplicates and application of Boolean operators were applied.

The documents analyzed were obtained by using the keywords «transmedia learning» in Spanish and English without time constraints (the overall volume of the search results did not make this necessary). This research was carried out in the two main international multidisciplinary databases, Web of Science and Scopus, in the international education-specific database Educational Resources Information Center (ERIC) and, finally, also in Dialnet, one of the most comprehensive Hispanic scientific archives.

The focus of this review is on transmedia teaching-learning (T-L) processes, in a general sense, without distinguishing between educational stages since the aim is to understand the concept of transmedia in education from a global perspective. The distinction between formal, non-formal and informal education has not been raised either. However, most of the documents obtained belong to the school environment. In a first phase, a search was carried out based on the descriptors indicated above and a total of 38 documents were obtained. After a detailed filtering (relevance, filtering for duplicates), a sample of, 22 documents was obtained, in a workflow which is showed in the Figure 1.

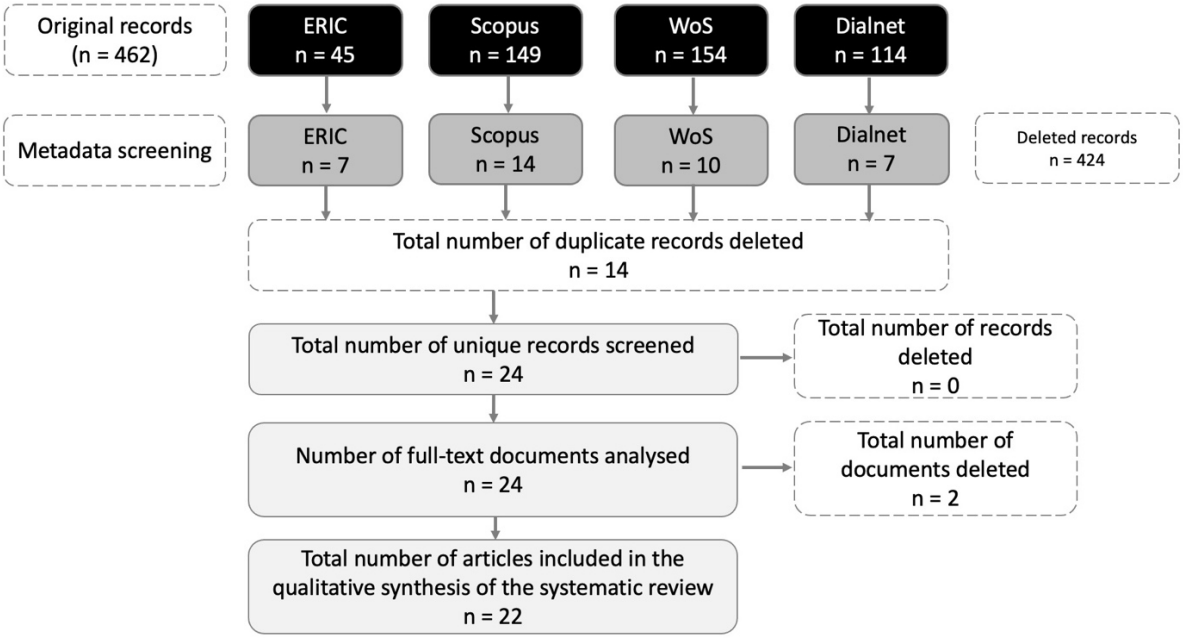

Figure 1. SLR workflow

The analysis of the data obtained was carried out using NVivo 12, with a copy licensed by the Department of Pedagogy of the University of Girona (Spain). Coding and categorization of the most relevant information from the documentary collection was carried out in the NVIVO 12 environment.

2.2 Documents analyzed

These are the 22 documents finally analyzed:

1) Amador (2013)
2) Barreneche et al. (2018)
3) Bernal Acevedo (2017)
4) Chung (2014)
5) Crespo-Pereira and Legerén-Lago (2018)
6) Davis (2017)
7) Dickinson-Delaporte et al. (2020)
8) Ellis et al. (2018)
9) Fleming (2013)
10) Gutu (2019)
11) McCarthy et al. (2018)
12) Paulsen and Andrews (2014)

13) Pereira and Pedro (2020)
14) Raybourn (2014)
15) Raybourn (2017)
16) Raybourn et al. (2018)
17) Raybourn et al. (2019)
18) Rodrigues and Bidarra (2014)
19) Rodrigues and Bidarra (2015)
20) Rodrigues and Bidarra (2019)
21) Valdés et al. (2016)
22) Wiklund-Engblom et al. (2013)

The 22 papers presented were published between, 2012 and, 2020 and are of different types: scientific articles (12), book chapters (2) or contributions to conferences (8). Documents can be broadly characterized as follows (Table 1):

Document	Document type	Ed. context or level	Research	Geo. Context	Main findings
Amador (2013)	Paper	General approach	No	-	Aprioristical opportunities in a general sense.
Barreneche et al. (2018)	Paper	Non formal education	Yes	Colombia	Transmedia learning as a community result Transliteracy as a need TL as a more natural way of learning for young people TL as evidence of young people's ability to adapt to a changing context
Bernal Acevedo (2017)	Paper	Higher education	Innovation	Colombia	Good students' performance, motivation and evaluation Improvement of group cohesion Better student-teacher interaction
Chung (2014)	Paper	Theoretical approach	No	-	Measuring educational data can be an opportunity to improve TL experiences
Crespo-Pereira and Legerén-Lago (2018)	Paper	Theoretical approach	Yes	-	Transmedia learning can have relations with neuroscience
Davis (2017)	Paper	Higher education (Arts)	Yes	Australia	A personal selection of media and digital flows can open new opportunities for learning and teacher training processes
Dickinson-Delaporte et al. (2020)	Paper	Higher education (Marketing)	Yes	Australia	Better learning experience and engagement; but implies a big challenge for some students
Ellis et al. (2018)	Conference proceedings	Non formal education	Yes	US	Improvements on children's interest on STEM Improvement on children's understanding of science content
Fleming (2013)	Paper	K-12	No	US	Constructivist and construccionists roots of TL Exciting learning affordances. Relation with real-life experiences
Gutu (2019)	Conference proceedings	Secondary Education	Innovation	Moldova	The alliance between TL and Flipped Learning can be an opportunity for improving learning
McCarthy et al. (2018)	Paper	Childhood and Primary Education	Yes	US	TL can amplify school impact out of the class, especially for low-income families TL can improve student's engagement and mathematical knowledge

Document	Document type	Ed. context or level	Research	Geo. Context	Main findings
Paulsen and Andrews (2014)	Paper	Childhood Education	Yes	US	TL can improve science knowledge Families' involvement improves learning outcome Intensive consumption of learning resources is directly related to learning outcomes
Pereira and Pedro (2020)	Conference proceedings	VET	Yes	Portugal	TL can link with students' interests and be a flexible approach. Students can engage better with TL experiences
Raybourn (2014)	Paper	US Army training	No	US	TL can be a way for a more immersive learning experience
Raybourn (2017)	Book chapter	Theoretical approach	No	-	TL fits with the current digital cultural framework and is related to distributed learning.
Raybourn et al. (2018)	Paper	Army training	No	US	TL fits the need of a more immersive learning approach.
Raybourn et al. (2019)	Book chapter	Theoretical approach	No	-	
Rodrigues and Bidarra (2014)	Conference proceedings	Higher Education (TESOL)	No	Portugal	TL related to project-based learning Immersive and integrative learning approach for second languages acquisition
Rodrigues and Bidarra (2015)	Conference proceedings	Higher Education (TESOL)	No	Portugal	
Rodrigues and Bidarra (2019)	Conference proceedings	Higher Education (TESOL)	No	Portugal	
Valdés et al. (2016)	Conference proceedings	Higher education	Innovation	Spain	TL can improve participation and interactivity Flexibility
Wiklund-Engblom et al. (2013)	Conference proceedings	Theoretical approach	No	-	Transmedia storybuilding (non-fiction narratives) offers dynamic learning possibilities in multiple and flexible stimulations. TL takes advantage of mobile-learning availability and allows students' learning appropriation.

Table 1. General characteristics of documents

And those sharing research experiences can be described as follows (Table 2):

Document	Methodology	Instruments	Sample
Barreneche et al. (2018)	Mixed methods	Survey Workshops Interviews	12-18 y. o. 245 subjects (survey) 10 subjects (workshops) 40 subjects (interviews)
Bernal Acevedo (2017)	Quantitative	Workshop Survey	82 subjects (pre) 119 subjects (post)
Crespo-Pereira and Legerén-Lago (2018)	Systematic Literature Review	Documental Analysis	Not detailed
Davis (2017)	Mixed methods (activity systems analysis)	Interviews Surveys Documents	70 teachers
Dickinson-Delaporte et al. (2020)	Qualitative	Interview	22 course participants
Ellis et al. (2018)	Quantitative (pre/post)	Survey	270 children from afterschool programs

Document	Methodology	Instruments	Sample
Gutu (2019)	Quantitative	Survey (pre/post)	65 students
McCarthy et al. (2018)	Mixed methods	Survey Interview	68 Childhood Ed. Students 83 1st grade students (and their families) and 4 teachers
Paulsen and Andrews (2014)	Ex-post facto	Survey Learning results	115 children (5-8 y. o.)
Pereira and Pedro (2020)	Mixed methods	Survey Learning results	30 (14+16) VET students, in two iterations
Valdés et al. (2016)	Workshop Qualitative approach	Document (tasks) analysis	78 pre-service teachers 18 group tasks

3. Results

3.1 What is transmedia learning?

From the reading of the documents analysed, there are two first important results: the first is to set Jenkins' conceptual framework (media convergence and participatory culture) as a general reference context; and the second, surprisingly, is the absence of a single or very shared way of understanding transmedia learning, beyond this common cultural framework. This lack of a clear common concept means that, together with transmedia learning, we can be talking about a significant diversity of possible applications to the educational field. It is what we could call the multiple educational faces of transmedia: transmedia storytelling, branding, performance, ritual, activism or spectacle (Dickinson-Delaporte et al., 2020). Indirectly, in one of the first reference texts (Fleming, 2013, p. 371) we find the foundations of what has somehow been found later, but formally it is not a definition, nor can it be explicitly traced in the later literature as such (there is, in fact, no recognition in that sense either):

> the application of storytelling techniques combined with the use of multiple platforms to create an immersive learning landscape which enables multivarious entry and exit points for learning and teaching. It is the unifying concept of the learning environment that is important since that can become a landscape for learning that has few, if any, boundaries. With philosophical underpinnings in constructivist and connectivist theories, a transmedia pedagogy uses technology in an integrated way that allows learners and content to flow seamlessly across media platforms. (Fleming, 2013, p. 371).

However, we do find here some of the essential elements: socio-constructivist roots, didactic application of sequential navigation between different media, leaping the boundaries of formal learning and the importance of a narrative. It is this narrative, as it develops through the involvement of the learner (in his or her own learning ecology or scenario) that drives cognitive change. In other words, it would be this:

> uma forma relevante de articulação entre os conteúdos pedagógicos e atividades que impliquem trabalho colaborativo, partilha de informações e interação. A abordagem transmedia pode ser definida como uma narrativa contada através de múltiplos meios de comunicação, utilizando diferentes tecnologias digitais. Esta perspetiva permite que o conteúdo principal envolvente seja distribuído por vários meios, utilizando o melhor de cada um deles para gerar interesse nos alunos e manter a sua atenção. As narrativas transmedia podem auxiliar o processo de ensino e aprendizagem ao permitir o desenvolvimento de estratégias que estimulem os alunos a produzir conteúdo, sendo participantes ativos no contexto educativo (Pereira and Pedro, 2020, p., 2)

In general terms, we can find the following elements, which will be summarized below in Figure, 2. Firstly, the socio-constructivist root is reaffirmed, which places the learner as the protagonist (Amador, 2013; Davis, 2017; Wiklund-Engblom et al., 2013).

The transmedia approach should be based on elements of everyday life, ensuring engagement and potentially greater transfer of learning (Chung, 2014; Raybourn, 2014; Rodrigues and Bidarra, 2014).

Transmedia learning involves the mobilization and development of wide-ranging digital literacies (a step beyond digital competence and media education from a consumer perspective) (Barreneche et al., 2018; Pereira and Pedro, 2020).

The technological element is flexible and liquid. It is not predetermined (neither in terms of resources nor in terms of sequencing). It adapts to the needs of each context and, therefore, allows overcoming the limitations and corsets of formal education (Davis, 2017; Ellis et al., 2018; Fleming, 2013; Gutu, 2019).

There is undoubtedly a community dimension to transmedia learning (learning in networks, collaboration), which links to connectivist approaches (McCarthy et al., 2018; Valdés Sánchez et al., 2016). This leads to the creation of communities of creation (and learning) (Raybourn, 2017; Rodrigues and Bidarra, 2015) that collaborate in community projects. The concept of transauthorship is born (Rodrigues and Bidarra, 2015, 2019).

Finally, we come to the didactic engine of the proposals, which is always a narrative (fiction or not), which makes the projects always storydriven (Barreneche et al., 2018; Chung, 2014). There is a wide consensus about the importance of these narratives in relation to student engagement (Chung, 2014). It is also emphasized that they are flexible from the teacher's point of view and malleable from the learner's perspective (Ellis et al., 2018; Fleming, 2013; Gutu, 2019; Raybourn, 2017). They are also potentially endless, which confers infinite possibilities for evolution and learning (Rodrigues and Bidarra, 2015).

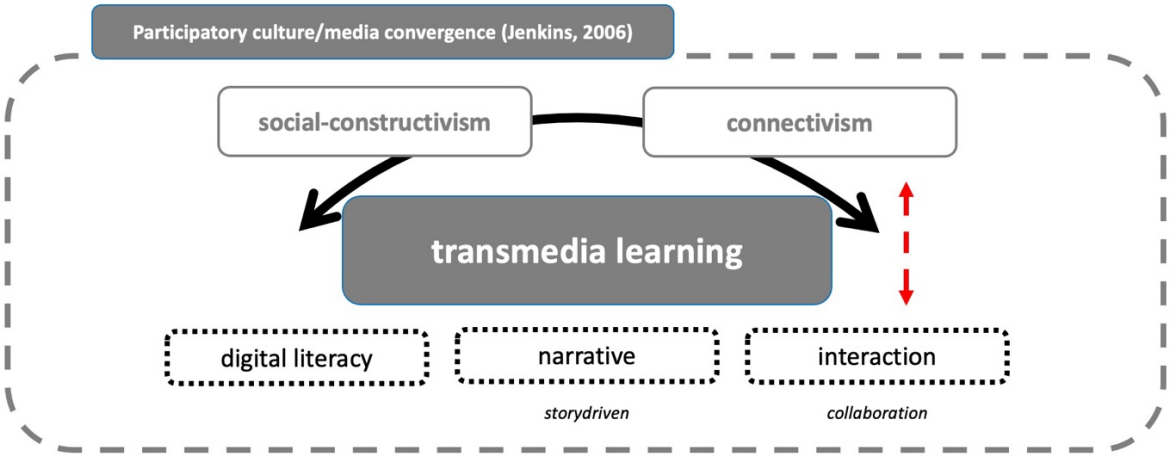

Figure 2. Elements of transmedia learning

3.2 What opportunities does transmedia learning present, in a general sense?

Transmedia learning, according to the documents consulted, has its opportunities in the following aspects. To begin with, we spoke earlier of the flexibility implied from the teacher's point of view and the malleability from the student's perspective (Chung, 2014; Ellis et al., 2018; Paulsen & Andrews, 2014). These two characteristics allow TL to be applied to a multitude of contexts and with a wide variety of didactic objectives.

This flexibility also allows the TL to allow a high degree of personalization of learning (Bernal, 2017; Fleming, 2013; Gutu, 2019; McCarthy et al., 2018) in the service of the characteristics of the learners; and this makes it possible to connect directly with their interests and learning needs (in relation to their

daily lives), which improves motivation and engagement in the process (Fleming, 2013; Valdés Sánchez et al., 2016).

The alternation of digital and analogue moments and the general flexibility of the TL allow learning to be ubiquitous and continuous. There is no direct or forced linkage to the classroom space, so school walls are overcome (Dickinson-Delaporte et al., 2020; Fleming, 2013; Raybourn, 2014) and school time constraints become meaningless.

The interaction inherent in TL is also an opportunity in many ways. On the one hand, agents that are not directly part of the school (educators, families, communities) can be integrated (Bernal Acevedo, 2017; Fleming, 2013; Raybourn et al., 2019). On the other hand, the heterogeneity of the learning groups (e.g. of the group-class) can be an enriching element that boosts the development of shared projects and allows everyone to learn by participating.

From the technological point of view, transmedia learning proposals are very liquid: the TL is intrinsically digital, but everyone can take advantage of both the digital resources available to them (without any prescription or requirement in this regard) and the digital skills they have at any given moment (Crespo-Pereira and Legerén-Lago, 2018; Dickinson-Delaporte et al., 2020). There is a transmedia path for everyone depending on their availability, technological competence and interests, so that low-tech and high-tech experiences and projects can coexist, without this being a problem or detracting from the result or the learning. And there is no doubt that in all cases, each transmedia path will involve the development of new media competences.

Finally, there is no doubt that, by developing narratives in interactive contexts, not only the specific didactic objectives and digital competences associated with transmedia are developed, but also countless transversal competences necessary for life together: communication, collaboration, artistic expression, etc. (Barreneche et al., 2018; Bernal Acevedo, 2017; Raybourn et al., 2018).

3.3 What opportunities does transmedia learning present, from an inclusive education perspective?

According to what is said and suggested in these documents we can highlight these opportunities for inclusive education (with an special mention to gender issues) (Table 3):

Document	Implications for inclusion	Regarding inclusion	Regarding gender
Amador (2013)	Personalization Customization	No explicit reference.	No explicit reference.
Barreneche et al. (2018)	Flexibility Participation Low technological profile	No explicit reference.	No explicit reference.
Bernal Acevedo (2017)	Engagement Participation Personalization of teachers' support	No explicit reference.	No explicit reference.
Chung (2014)	Adaptative systems Adaptative teacher support Personalization	No explicit reference.	No explicit reference.
Crespo-Pereira and Legerén-Lago (2018)	TL can improve neurophysiological mechanisms related to emotion and cognition (UD-L)	No explicit reference.	Low consideration of how gender differences can be found in multimedia products impact.
Davis (2017)	Personalization Low technological profile (personal choice of media)	No explicit reference.	No explicit reference.
Dickinson-Delaporte et al. (2020)	Better affective and cognitive engagement	No explicit reference.	No explicit reference.

Document	Implications for inclusion	Regarding inclusion	Regarding gender
Ellis et al. (2018)	Engagement	No explicit reference.	No explicit reference.
Fleming (2013)	Personalization Learners' empowerment	Inclusive approach inherently related to TL	No explicit reference.
Gutu (2019)	Personalization (learning pace) Efficiency (in terms of costs)	No explicit reference	No explicit reference.
McCarthy et al. (2018)	Opportunities for low-income families and for going beyond face-to-face classes	Socioeconomical approach for diversity	No explicit reference.
Paulsen and Andrews (2014)	Opportunities for low-income families and for going beyond face-to-face classes Families' involvement	TL as an opportunity for inclusion from a socioeconomical approach (especially regarding families' key role)	No explicit reference (although the paper falls into the "STEM" issue, usually related to gender approaches)
Pereira and Pedro (2020)	Personalization Flexibility Engagement	No explicit reference	No explicit reference
Raybourn (2014)	Engagement Personalization	No explicit reference	No explicit reference
Raybourn (2017)	Participation, interaction Engagement	No explicit reference	No explicit reference
Raybourn et al. (2018)	Immersive learning Engagement	No explicit reference	No explicit reference
Raybourn et al. (2019)	Immersive learning Engagement	No explicit reference	No explicit reference
Rodrigues and Bidarra (2014)	Participation Engagement	No explicit reference	No explicit reference
Rodrigues and Bidarra (2015)	Participation Engagement	No explicit reference	No explicit reference
Rodrigues and Bidarra (2019)	Participation Engagement	No explicit reference	No explicit reference
Valdés et al. (2016)	Customization	No explicit reference	No explicit reference
Wiklund-Engblom et al. (2013)	Engagement Personalization Wide range of digital tools (BYOD models)	No explicit reference	No explicit reference

Table 3. Key aspects of TL from an inclusive education perspective

From these data, different ideas are drawn in relation to TL opportunities from an inclusive perspective, and they are closely linked to the opportunities that, in a general sense, had already been identified in the previous section. It should be noted, however, that the relationship between TL and inclusive education is not addressed in the documents we analyzed, except in the cases of Chung (2014) and Paulsen and Andrews (2014) (both contributions, in fact, come from the same educational initiative, the PBS Kids project, in the US). In that case, the transmedia approach is born with the will to offer educational resources that overcome the limitations of time and space of the school, and it focuses directly on families with low economic resources. In this case, however, we must recognize that the proposal stands out more for the desire to involve the most socioeconomically disadvantaged families and improve children's mathematics learning than for the actual use of transmedia experiences (Sánchez-Caballé and González-Martínez, 2021), since transmedia in this case is reduced to offering different multimedia resources so that families can continue learning at home in a motivating way. In the rest of the cases, as can be seen, there is no express reference to the possibilities (or evidence) of transmedia in an inclusive perspective. And

even more silence is found in relation to the gender issue (which is not addressed or mentioned in any of the texts).

However, in line with what we said in a general perspective, there are many characteristics of transmedia learning that are harmonious with a universal design for learning model (not exclusive to TL, of course), but potentially useful: on the one hand, the community dimension, which provides that a significant part of learning is collaborative (the transmedia products that are generated are community-based and are enriched by the heterogeneity of these groups) (Bernal Acevedo, 2017; Rodrigues & Bidarra, 2019; Valdés et al., 2016). Another important characteristic would be the engagement that is evident in the few investigations in this regard. A cognitive as well as affective engagement (Crespo-Pereira & Legerén-Lago, 2018; Dickinson-Delaporte et al., 2020), which is highlighted in a very general way (Ellis et al., 2018; Pereira & Pedro, 2020; Raybourn et al., 2019) and which connects directly with the UD-L idea of offering different forms of engagement so that everyone can be involved with learning according to their own nature. And finally, and perhaps one of the most important potentialities, the constant idea of personalization and adaptation that TL inherently implies (Davis, 2017, Barreneche et al., 2018): the educational proposals are flexible, so that the learning subject can develop them according to his own decisions (individual and group), allowing him to consume the educational resources that best suit his needs (different forms of representation) and to produce his evidence in the way that is most natural and profitable for him (different forms of action). As we see, then, TL offers simple opportunities to respond to the principles of UD-L (Alba Pastor, 2016) and, what is also very interesting, allows that proposal to be low-profile technologically, which points to high efficiency in terms of resources (Davis, 2017; Gutu, 2019).

It is this last idea that leads us to the reflection on gender. As we said at the beginning of this section, in the analyzed documents we do not find a specific look at gender. And that, in itself, is to some extent evidence of the density of gender gaps (and of the need for a gender perspective in both teaching and research). However, it is precisely this low technological profile of transmedia proposals that may prove to be an opportunity for digital gender education. TL does not imply the concrete use of certain technologies (devices or resources), so it can be concretized from what the teacher and their students choose (what they have available, what they can access) (Barreneche et al., 2018; Davis, 2017). And that can allow girls, when developing their transmedia projects, to choose the technologies they have at their disposal and those in which they feel more capable (without impositions), so that they gain digital fluency and can make meaningful use of their access to technology in learning contexts (two of the most common and deepest forms of the gender digital divide, in addition to access and possession of digital devices themselves) (Acilar & & Sæbø, 2021; Mariscal et al., 2019).

4. Discussion and conclusions

Based on this characterization of TL and the opportunities it offers, we must ask ourselves to what extent this corresponds to an opportunity in terms of inclusive education under the UD-L perspective, firstly, and secondly, in terms of digital gender divides.

In relation to this, transmedia learning offers undoubted opportunities, especially in relation to the flexibility of its approaches (Chung, 2014; Paulsen & Andrews, 2014; Raybourn et al., 2019) and the possibility of personalizing learning experiences (Fleming, 2013; Gutu, 2019; McCarthy et al., 2018). The case of Inanimate Play (Fleming, 2013), for example, perfectly represents how TL lands as a liquid layer that takes on the shape of the context and thus evolves as each person evolves with their family, at their own pace and according to their own interests. From teachers' perspective, transmedia learning approaches allow different forms of representation to be offered that fit the preferences of each student; and, from the student's perspective, transmedia learning allows for experiences that link to one's own interests and that develop as each one drives them, both from the point of view of the content and the languages used in the different sequences. Therefore, not only do we find a multiplicity of forms of representation in what teacher offers, but also a multiplicity of forms of involvement and action for every student (Alba

Pastor, 2016; Rapp, 2014). These are all features that allow for personalization (from a teaching and learning perspective), which is positive in terms of inclusion.

Not only does this align transmedia learning with inclusive education, but we can also highlight two other elements that seem relevant to us: the flexible technological profile and the collaborative element. In relation to that, we saw that transmedia is an undemanding technological proposal, insofar as it does not require specific sequences, specific devices or resources, or higher-level digital skills (Crespo-Pereira & Legerén-Lago, 2018; Dickinson-Delaporte et al., 2020). And, in opposition, we start from an idea that we stated at the beginning: digital educational proposals must always take into consideration the possible digital gaps of access (our schools or students may not have certain resources) and competences (the digital competence level cannot be taken for granted, nor is it homogeneous) (Midoro, 2015; Pieri, 2011). In this sense, the fact that transmedia learning is flexible and open in relation to technology allows different communities to experiment with what they have and mobilize what they know how to do from a technological point of view; it also allows each individual to face the transmedia challenge by comfortably mobilizing what they know, in the creative way Obradović et al. (2015) demand and something goes far beyond to the simple distribution of devices (guaranteeing digital access, according to van Dijk, 2012). And it is geared towards everyone (individuals and community) growing from a digital point of view. On the other hand, the collaborative element is along the same lines. Transmedia learning requires and thrives on collaboration (Bernal Acevedo, 2017; Raybourn, 2014, 2017), especially when learning projects are common. And this enables the three necessary conditions for inclusive education: respect, coexistence and participation.

As far as the gender digital divide is concerned, we can start from what we have just said, insofar as inclusive education is inclusive for everyone. Therefore, a more inclusive education in terms of UD-L, technological accessibility and collaboration is undoubtedly also more inclusive in feminist terms. However, there are some more elements that we can implicitly add, although the silence of the literature (at least of the documents consulted) is worrying in this regard. The gender digital divide is undoubtedly complex in nature: there are issues around how women see themselves as valid for technological choices, differences in technological use and more hostile technological contexts for women (Clark & Gorski, 2002). As to that, we see an interesting opportunity in the characteristics of transmedia learning. The literature says that it is difficult to find real gender differences in digital competence (Elena-Bucea et al., 2020; Vázquez-Cano et al., 2017); and that, in that sense, gender differences do not affect all women equally, so the digital gender divide is heterogeneous (Gil-Juárez et al., 2012). However, it is traditional that men consider themselves to be more competent (or women less so) in all aspects of mobilizing digital competence that have more to do with the technical elements (Barragán & Ruiz-Pinto, 2013; Cabezas González et al., 2017) while women stand out in processes linked to information management or interaction (Flores Lueg and Roig-Vila, 2017; Grande-de-Prado et al., 2020). If we link all this with the characteristics we have developed of TL, it seems plausible to think that it could also be a good way to fight against gender divide at school: a proposal that allows them to rely on what they are strongest in and that allows them to choose the technical path that is most comfortable for them, which allows them to empower themselves and to consider, logically, that girls are just as capable as boys are in the technological sphere (Palomares-Ruiz et al., 2020).

A final reflection may lead us to consider the practical implications of all these reflections. Although much remains to be answered from the point of view of research evidence, what we have analyzed a priori of TL and what we know from the little research to date is consistent with the principles of inclusive education (Banes et al., 2020; Mazzer, 2018) from a digital point of view: offering learning opportunities that allow participation and personalization (both of the resources we offer and those produced by the students themselves) and that are flexible (both in outcomes and in learning rhythms). The TL idea suggests focusing on a narrative that each student should develop at his or her own pace, but supported by the group (Davis, 2017; Dickinson-Delaporte, 2020), with the technologies one chooses (Barreneche et al., 2018, Chung, 2014) offers motivating and inclusive educational opportunities (Ellis et al., 2018; Rodrigues & Bidarra, 2015). And, at the same time, that can have positive consequences from a gender perspective, as we have seen.

In short, transmedia learning, according to what we find in the literature, can be an interesting opportunity for inclusive digital education, and a possible way (among others, into different levels) to a possibility to neutralise the barriers to digitally inclusive education AlSadrani et al. (2020) certify (insufficient resources, heavy workloads, standardised learning paths, lack of training, etc.).

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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