



## OPEN ACCESS

## EDITED BY

Mohammed A. Al-Sharafi,  
University of Technology Malaysia,  
Malaysia

## REVIEWED BY

Ahmad Fadhil Yusof,  
University of Technology Malaysia,  
Malaysia  
Layla Hasan,  
University of Technology Malaysia,  
Malaysia  
Amr Abdullatif Yassin,  
Ibb University, Yemen

## \*CORRESPONDENCE

Veruska De Caro-Barek  
Veruska.de.caro@ntnu.no

## SPECIALTY SECTION

This article was submitted to  
Digital Education,  
a section of the journal  
Frontiers in Education

RECEIVED 29 July 2022

ACCEPTED 02 November 2022

PUBLISHED 01 December 2022

## CITATION

De Caro-Barek V (2022) Everyone  
loves a good story: Learning design  
in massive open online courses  
for language learning.  
*Front. Educ.* 7:1007091.  
doi: 10.3389/feduc.2022.1007091

## COPYRIGHT

© 2022 De Caro-Barek. This is an  
open-access article distributed under  
the terms of the [Creative Commons  
Attribution License \(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use,  
distribution or reproduction in other  
forums is permitted, provided the  
original author(s) and the copyright  
owner(s) are credited and that the  
original publication in this journal is  
cited, in accordance with accepted  
academic practice. No use, distribution  
or reproduction is permitted which  
does not comply with these terms.

# Everyone loves a good story: Learning design in massive open online courses for language learning

Veruska De Caro-Barek\*

Department of Social and Educational Sciences, Norwegian University of Science and Technology,  
Trondheim, Norway

These couple of years have witnessed an increase in interest in Higher Education Institutions (HEIs) have for Massive Open Online Courses (MOOCs). As the COVID-19 situation amply showed us, MOOCs promptly became a practical way to secure continuity of education for students in lockdown. Educational institutions chose the MOOC format to swiftly adapt to the “new normal” and deliver their courses online without incurring too many unbudgeted expenses. However, the quality of teaching practices and learning design in MOOCs’ Digital Learning Environments (DLEs) varies considerably. Also, while the interest in the MOOC format has increased, the emergent body of specific research on MOOCs for language learning or Language MOOCs (LMOOCs) is unfortunately still limited. By choosing a *connectivist* approach to understand teaching and learning dynamics in DLEs, this article will elaborate on the importance of learning design and Digital Story Telling (DST) to create sustainable DLEs in MOOCs for Language Learning. The main research question investigates whether and how the development of a comprehensive and interconnected narrative structure based on DST can enhance the participants’ learning experience in LMOOCs and facilitate language learning leading to better participant retention and higher completion rates. To illustrate and support the logic threads of the argumentation, the article introduces a *mixed-methods or multi-modal study* of three international LMOOCs in Norwegian for beginners (NfB) developed for the international e-learning platform FutureLearn (FL). The findings discussed in the article seem to corroborate the initial hypothesis that including a comprehensive narrative structure based on DST and inspired by principles of Connectivism can lead to the development of higher-quality DLEs in MOOCs, specifically in LMOOCs.

## KEYWORDS

language MOOC, digital learning environments (DLEs), digital story telling (DST), mixed-methods grounded theory (MMGT), Connectivism

## Introduction

March 2020 and the subsequent lockdown due to COVID-19 initiated a domino effect of changes in the educational sector forcing educators worldwide to digitalise and reconsider their teaching practices and learning habits (Allen et al., 2020; Wotto, 2020). When it seemed that Massive Open Online Courses (MOOCs) had disappeared from the domain of public debate due to a loss of popularity in the past few years, they have now regained terrain with rejuvenated strength (Reich and Ruipérez-Valiente, 2019; Lohr, 2020).

Educational Institutions chose the MOOC format to swiftly adapt to the “new normal” and deliver their courses online without incurring too many unbudgeted expenses as a practical way to secure continuity of education for students in lockdown. Strategic decisions have led the biggest providers in the MOOCs arena (Coursera, EdX, and FutureLearn) to offer free content courses for a period of time to meet the demands of universities impacted by the COVID-19 situation, and of an increasingly larger number of temporary laid-off workforce in need of updated skills. The result is that fully online courses and MOOCs, in particular, are, once again, in high demand.

However, while the interest in MOOCs has increased in the past few years, the emergent body of specific research on MOOCs for language learning or Language MOOCs (LMOOCs) is still limited (Perifanou, 2016; Read et al., 2021). There is nonetheless a general consensus that Digital Learning Environments (DLEs) in MOOCs pose different challenges from campus face-to-face teaching, and a paradigm shift in how educators design and to teach in online courses like MOOCs is sorely needed (Bonfield et al., 2020). As MOOC technology evolves, thanks to platform integration of newer convergent technologies, so should the underlying pedagogical/didactical approaches to learning design in MOOCs.

In this article, a connectivist approach to the understanding of teaching and learning dynamics in DLEs has been chosen to frame the discussion. The article will also argue for and propose the importance of integrating principles of Digital Story Telling (DST) in the learning design of sustainable DLEs in MOOCs.

The overall aim of the article is to highlight best practices in learning design for the development and deployment of MOOCs, and LMOOCs in particular. To illustrate and support the logic threads of the argumentation, the article introduces a mixed-methods or multi-modal study of three international LMOOCs in Norwegian for beginners (NfB) developed for the international e-learning platform FutureLearn (FL).

The course series developed for FutureLearn was an introduction to the study of Norwegian and was meant to appeal to both course participants interested in learning Norwegian for fun or out of personal reasons, as well as to learners needing to learn Norwegian because living, working, or studying in the country (see text footnote 1).

However, the scope of this research does not entail the investigation of the studying of Norwegian *per se*. The intention is to derive interesting data from a case of successful LMOOCs that can be used to inform good practises in the development and implementation of learning design for LMOOCs in general.

Based on the remarkably positive feedback from the course series NfB and supported by quantitative data provided by the platform’s Learning Analytics,<sup>1</sup> the following research questions were investigated:

- Whether and how the development of a comprehensive narrative structure based on DST can enhance the participants’ learning experience in fully online self-paced language courses like LMOOCs?
- Whether and how such an interconnected narrative structure can facilitate language learning from the participant’s point of view, leading to better participant retention and higher completion rates.

First, a summary of relevant research literature on the topic is presented to frame the theoretical background for the study. Second, methodology choices are explained and justified by examples illustrating different stages of the research journey. Finally, results from the study are presented and discussed with examples and quotations from the participants.

## Theoretical contextualisation and relevant literature review

### Massive open online courses and digital learning environments

Following Downes, 2008 traditional classification, MOOCs fall into two main categories.

- 1) Connectivist MOOCs (cMOOCs): Mostly self-driven and loosely organised networks of distributed online resources mimicking the first historical MOOC “*Connectivism and Connective Knowledge*” taught at the University of Manitoba in the first decade of 2000 by Downes and George Siemens themselves (Downes, 2012; Yurkiw, 2017; Zhu et al., 2018).

<sup>1</sup> Learning Analytics is a research and development field that encompasses the development of technological platforms, statistical analysis methods, and the interpretation and use of analysis results. Analytics is a term used for automated collection and analysis of large amounts of digital data as a basis for making decisions and interventions. Within Learning Analytics, this technology is used to understand and improve learning processes (Lid, 2013) in DLEs.

- 2) Extended MOOCs (xMOOCs): Traditionally, structured online-based courses developed in partnership with universities and popularised by MOOC platforms, such as FutureLearn, edX, Coursera, and Udacity (Zhu et al., 2018).

At the beginning of the MOOC era, courses were freely open to everybody interested, with no prerequisites needed and no formal assessment and grading provided (Bonk et al., 2015, 2018). Many educators and researchers were foreseeing the pedagogical disruptive potential inherent in cMOOCs in terms of access to free education (Bonk et al., 2015), courses' scalability, and personalisation to better suit learners' needs (Bonk et al., 2018b). However, comprehensive literature reviews up to now reveal a change of course in the ways MOOCs are designed, organised, and delivered.

The progressive centralisation of the MOOC within a few commercial providers together with the increasing need for certifications and accreditations to meet the requests of partner universities have redirected the MOOC's pedagogical and business model course toward more traditional formats. Most MOOC providers nowadays grant unlimited access to learning resources only behind a pay wall, certifications and accreditations are provided on demand after the payment of a fee, courses are more predictable and tightly structured so to fit into university curricula and consequently, they are more focused on content delivery and individual learning. Whilst easier to develop, implement, maintain, and assess, current xMOOCs have been often criticised for adopting instructional approaches that rely heavily on behavioural theories and models, rather than learning through peers and social networks as Downes and Siemens first intended with their cMOOC (Liyaganawardena et al., 2013; Bonk and Lee, 2017; Bonk et al., 2018; Sanchez-Gordon and Luján-Mora, 2018; Palacios Hidalgo et al., 2020). Other aspects that critics often have brought to the MOOC debate are the massive dropout rates of up to 50% of participants after a few days of enrolment, a too rigid assessment structure focused on summative evaluations rather than formative, and the inability of MOOC providers and developers to facilitate the creation of a truly autonomous learning community on the platform (Palacios Hidalgo et al., 2020). In addition, an increasingly relevant debate has been taking place for the past 10 years concerning the limitations and downsides of MOOCs in developing countries on the African and Asian continents. Here, researchers have turned the spotlight on the accessibility barriers to online learning constituted by either limited local technological infrastructure and/or linguistic challenges (Liyaganawardena et al., 2013; Sanchez-Gordon and Luján-Mora, 2018).

However, in an attempt to overcome the aforementioned frustrating low completion rates, the last decade has also witnessed the development of new types of MOOCs

(Palacios Hidalgo et al., 2020) and a new generation of so-called hybrid MOOCs (hMOOCs) (Fidalgo-Blanco et al., 2016).

Also, among the "new" types of MOOC, the taxonomy often seems to conceal what, at a closer look, might be considered a rebranding of either the cMOOC or the xMOOC designs. sMOOCs, or *social* MOOCs, are, for example, "fundamentally social courses characterised by interactivity using social networks, making users participate as active agents in the course and moving from connectivity to engagement". The name might have changed from cMOOC to sMOOC, but it is still possible to retrace the fundamentals of sMOOC design back to the very first cMOOC and Downes' and Siemens' ideas of social network learning through technology.

The hMOOCs, on the other hand, combine the characteristics of xMOOCs and cMOOCs. In hMOOCs, the traditional teacher-directed and instruction-based learning design extensively used in xMOOCs is combined with the informal, self-driven, web 2.0-based social learning model typical of cMOOCs (Fidalgo-Blanco et al., 2016). The underlying pedagogical continuum in such MOOCs spans widely from cognitive behaviourist to social constructivist and connectivist approaches to teaching and learning (Dunaway, 2011; Anders, 2015). To meet the different needs of learning environments in MOOCs as well as the large heterogeneity of MOOC participants, educators and course developers have introduced different learning design models (Bonk et al., 2018).

The development of these learning models, however, depends essentially on the economic resources available to the educational institutions responsible for the MOOC's development, which in turn will impact the choice of technology implemented in the course design as well as the decision of providing, or not, course instructors.

There has undoubtedly been a technological as well as a social evolution in the way learners now are approaching education, and the global lockdowns have forced us to acknowledge the need for more flexibility in Higher Education. However, many higher education institutions still regard MOOCs merely as a necessary part of the emerging modalities of e-learning and online education (Buhl and Andreasen, 2018). Despite MOOCs being of interest from a lifelong learning perspective in offering potential solutions to the increasing need for education worldwide, they are mostly seen as time- and cost-saving solutions to cater to an increasing number of students that universities' physical campuses can questionably manage to host (Calderon, 2018, p. 6; Nykvist et al., 2021).

## Digital learning environments

In general, DLEs in MOOCs, especially with the advent of Web 2.0 convergent technologies, have been posing a

challenge to the traditional classroom teaching paradigm. MOOCs offer flexible solutions in time and space and the possibility to tailor learner-centred curricula and establish personal learning networks to foster life-long learning beyond traditional educational frames (Buhl and Andreasen, 2018).

As mentioned in the previous paragraph, designing sustainable DLEs in MOOCs is, however, a complex process intrinsically linked to available economic resources (Buhl and Andreasen, 2018). In the face of reality, ideologically inspired pedagogical approaches are seldom at the centre of learning design in MOOCs, and the MOOC phenomenon itself shows “a general development towards market mechanisms, and a decreasing interest in discussions of pedagogy” (Buhl and Andreasen, 2018, p. 153).

Thus, a considerably cost-effective way of producing MOOCs in HE is to provide learners with a course curriculum made up of instructional videos, often as Open Educational Resources (OER) or self-made, live streaming sessions from campus-based lectures and a set of appropriate exercises and tests that may or may not be compulsory. The course can then be self-driven and self-paced with just perhaps a few course instructors involved mostly as evaluators in the case of compulsory learning activities. In this case, technology solutions come first, pedagogy last, and the so-called disruptive force of MOOCs stands elusive. It is ironic, as Biesta (2019) cleverly highlights, that the recurrent practice for the most popular tech-mediated educational forms, from MOOCs to TED talks to YouTube instructional videos, is to stage a very traditional teaching style “with someone talking and explaining so that others can watch, listen and learn” (p. 50).

## Language massive open online courses

Assessing the quality of DLEs in MOOCs is a demanding task as there are many types of MOOCs, as well as many purposes of MOOC providers (Stracke and Trisolini, 2021). In their newly published literature review, Stracke and Trisolini (2021) identified four main dimensions within which it is possible to frame quality aspects of a MOOC: organisational, technical, social, and pedagogical. The pedagogical dimension emerged unsurprisingly as the most important dimension related to the quality of MOOCs (Stracke and Trisolini, 2021, p. 8).

On this last note, a particular case concerns MOOCs for Language Learning. Despite the growing body of research on MOOCs in general and many studies advocating the relevance MOOCs have for education (Ramírez-Fernández, 2015; Shen and Kuo, 2015; Escudero and Núñez, 2017; Callejo-Gallego and Agudo-Arroyo, 2018; Palacios Hidalgo et al., 2020), there is still a pronounced scarcity of studies directed toward the investigation of the potential MOOCs could have in supporting

Language Learning (Palacios Hidalgo et al., 2020, pp. 873–874). Unfortunately, the consensus from the research available is that the quality of LMOOCs varies considerably and that most of LMOOCs have failed to offer interactive environments where learners can connect to a language learning community and collectively build their language skills (Perifanou and Economides, 2014; Perifanou, 2016).

The conundrum for LMOOCs is namely that language learning is skill-based, contextual, and grounded in interaction and co-construction of meaning (Martin-Monje and Bárcena, 2014; Council of Europe, 2017). Ironically, one of the possible causes for LMOOCs' unreliable quality resides in the platform technology employed. Technological advancements in MOOC platforms are not sufficiently developed to meet the specific requirements of language didactics (De Caro-Barek, 2019). None of the major existing platforms, for instance, seem to present embedded technology that can enable course participants to fully develop their oral interaction skills (Martin-Monje and Bárcena, 2014; De Caro-Barek, 2019). Most of the course content relies on written interaction, except for fully tutored LMOOCs, where feedback on the participants' oral performance takes place with the aid of external technological resources, such as videoconferencing and/or voice recognition devices for training pronunciation of, again, variable quality. In self-instructed courses, there is neither the possibility for live oral interaction nor external feedback on the platform (Martin-Monje and Bárcena, 2014; Perifanou and Economides, 2014; De Caro-Barek, 2019). It is important to note that many LMOOCs are indeed self-instructed and based on the concepts of autonomous learning. In this case, platform technology is not necessarily synonymous with better teaching or learning. Learners are still studying language in a traditional way, following courses based on cognitive behavioural pedagogical models and individual learning. Such courses show extended use of instructional videos and pre-formatted learning sequences, which focus on written comprehension and production but offer very limited possibilities to develop the learners' oral interaction skills and their actual capability of having a conversation in the target language (Castrillo and de Larreta-Azelain, 2014; Perifanou and Economides, 2014, p. 3568; Perifanou, 2016). When DLEs in LMOOCs fail to support solutions for live oral interaction, a question arises concerning the learner's actual possibility of fully developing the range of linguistic competences necessary to master the target language. Similarly, a concern becomes apparent about the integrity and validity of the language course and the possibility of future assessment and accreditation. These are indeed pressing demands which need to be addressed by LMOOC developing institutions and LMOOC platform providers due to the increasing demand for course accreditation in the private and HE sectors (De Caro-Barek, 2019).

Even within the technological constraints of the FutureLearn platform, one of the intentions of the course series NfB investigated in the present study was namely to move away from this “sage on the stage” paradigm and, instead, adopt a “guide on the side” type of learning design. To do so, a connectivist approach to understanding teaching and learning dynamics in DLEs (Siemens, 2007; Downes, 2008, 2020; Siemens et al., 2020) was chosen, combined with the implementation of DST for the establishment of higher quality DLEs in LMOOCs.

While there is a substantial body of research on either Connectivism or DST *per sé*, and/or with reference to MOOCs in general, research on the application and combination of *both* approaches in MOOCs for Language Learning is to our knowledge very limited. Besides contributions from the author and a few other exceptions (Phan et al., 2016; Dos Reis, 2017; Piray Lema, 2018), it is hard to find research exploring these topics together. Also, most of the research on Connectivism dates from 2005 to 2018 and as such, it calls for new perspectives. The following paragraph highlights the principal aspects of Connectivism and DST in connection to LMOOCs and about this study in particular.

## Connectivism and digital storytelling

Connectivism (Siemens, 2005, 2007; Downes, 2020) as a theoretical framework can be useful to better understand how learning happens in open DLEs as the ones in MOOCs.

According to Siemens (2004), the advent of technology challenged established learning theories as they seemed no longer able to provide an accurate explanation of how and where the learning occurred. Three main limitations are identified (Yurkiw, 2017; Boyraz and Ocak, 2021):

- 1) Traditional learning theories such as Behaviourism, Cognitivism, and Constructivism approach learning from either an individual or intrapersonal perspective and view of learning.
- 2) They seem to ignore the learning that can occur outside of human beings and fail to address learning that is located within technology and organisation systems.
- 3) They focus on how to learn and on teaching paradigms and ignore the value of what is learned and of the process of decision-making needed to make good learning judgements in knowledge-rich environments (Bell, 2011, p. 102).

Connectivism rethinks the concepts of learning and knowledge, and instead, defines learning as *actionable knowledge*, not as a process for retaining information. Actionable knowledge is found in the way individuals relate and react to the continuous shifting of digital information

landscapes (Siemens, 2005) and in the understanding that learning happens in the extension of and interaction with our personal (learning) networks, and not solely in the human form (pp. 5–6). Knowledge is not necessarily directly deriving from an individual’s learning anymore and not necessarily in sole interaction with other human beings. As Siemens puts it: “Decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality. While there is a right answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision” (p. 5). Consequently, knowledge cannot any longer be understood and defined as the individual’s retaining of previous notions, as these can reside in any constellations of knowledge flow where “people, groups, systems, nodes, entities can be connected to create an integrated whole. Alterations within the network have ripple effects on the whole” (p. 4). Hence, it is not sustainable to understand knowledge as an artefact anymore, as something you can transfer directly from the teacher to the learner by following specific didactical practices. Knowledge and the learning process that leads to it are rather negotiable knowhow, debatable values in a shifting context of meaning and purpose where, on a personal level, it is increasingly difficult to discern the learner from the teacher (pp. 5–6).

Critics of Connectivism as a learning theory often point out a lack of substantial significant research on the topic (Kop and Hill, 2008). They also claim that, as a theory, Connectivism does not seem to introduce any new principles that have not already been discussed in traditional learning theories, and that “it focuses too much on knowledge and not enough on learning, suggesting that it would be more appropriate to consider it as curriculum rather than a learning theory” (Bell, 2011; Yurkiw, 2017).

Being a relatively novel theoretical approach, more research is indeed needed. However, despite criticism and still being a “work in progress” learning theory (Boyraz and Ocak, 2021), interest in connectivist approaches to DLEs has increased consistently in recent years (*ibid.*). Networked information technologies are nowadays an unescapable component of the learning process (Dunaway, 2011). As Foroughi (2015) underlines, Web 3.0 maximises “communication and interoperability between and among web sites and electronic devices, so that computers themselves will have the capability of searching for, organising, and finding connections among pieces of information” (p. 12). This aspect of human–technology interaction impacts the way our brain processes and stores information and eventually learns. In the era of AI and the “Internet of Everything” (IoE), Connectivism’s appeal cannot be denied as it accounts for aspects of paedagogy and education intertwined with current technological development in a way no previous learning theories have considered.

In this aspect lies the reference that links Connectivism to Digital Storytelling as a useful practical frame to better

organise and display learning content in open DLEs as the ones in MOOCs.

Digital Storytelling (DST) has been promoted and applied at the Center for Digital Storytelling, now StoryCenter, since the 1990s. In Education, DST is employed as a technology-enhanced teaching and learning approach and is often adopted as a student-centred stand-alone pedagogical approach, or in combination with other pedagogies (Wu and Victor Chen, 2019; Shahid and Khan, 2022). Robin (2008) comments for instance that Educational Digital Storytelling (EDS) enables students to develop 21st-century digital and media literacies (Robin, 2008; Wu and Victor Chen, 2019), as it integrates the art of storytelling with multimedia components, visuals (images/animations), and video/audio/web publishing technologies (Nair and Yunus, 2021).

The success of DST as a teaching and learning practice lies in that it allows also non-media-content experts to share their personal stories in a compelling way. The revolutionising approach of the DST movement has always revolved around the potential for change and transformation that resides in people's voices as individuals or communities.<sup>2</sup> That is probably the reason DST is a preferred approach in Language teaching and learning practices. A systematic review from 2021 (Nair and Yunus, 2021) highlights how DST “makes it possible for the students to construct digital stories and personal experiences and thereby improve their own understanding of the matter and thus allows them to speak more fluently” (p. 11).

By focusing on the narrative of the learner and on authenticity, DST has been proven to increase learners' engagement and promote both independent and collaborative learning as “learners collectively assemble their respective wisdom, ideas, imagination, and skills to work out the project given to them” (Shahid and Khan, 2022, p. 607).

Similarly to Connectivism and its root-concepts of networked learning and actionable knowledge, the employ of DST in education, and in language education particularly, focuses on language learners' critical thinking and digital literacy, their collaboration skills and their ability to evaluate situations and make decisions, so that they can in turn improve their language learning skills (Moradi and Chen, 2019; Maravelaki and Panagiotidis, 2022).

Combining a connectivist theoretical framework with DST seems therefore to be an ideal match when designing DLEs in LMOOCs, as DST transcends classic semiotic boundaries and is regarded as an activity that can both enrich the teaching practices and foster learners' active behaviour in DLEs (Robin, 2006, 2008; Rubino et al., 2018; Maravelaki and Panagiotidis, 2022).

In their pioneering works, Robin (2006, 2008) and Lambert (2013) identified seven elements that contribute to an effective

digital story. A good teacher is a good storyteller. A good storyteller can turn the driest of academic subjects into a fascinating and exciting novel. When the subject is mediated by a screen in DLEs, a good storyteller will have to turn the course subject into the best of film scripts. At the core of DST are the personal narratives of the individuals creating the story. The teacher, however, is just but one of the personal narratives conveying their side of a story—the course subject. For learning to occur and knowledge to be acquired, the personal narratives of the learners must agree on the story which has been told. This is true of any story regardless of the subject or modus docendi of the MOOC. This process is never easy, and no one can ever have control over how it develops and ends. It is however possible to create learning environments that can facilitate the way in which the story is presented, and the way learners can interact with and act upon it.

In Table 1, the traditional seven elements of DST (Robin, 2006) are presented to the reader. Among them, three key elements are vital in the design of a LMOOCs and can be summarised as follows:

- A dramatic question to introduce the plot of the story, or the subject of the course, and initiate a reflection process in the course participants
- An emotional content that speaks to the ones sharing the story in a personal and powerful way
- A personal voice to tailor the story and help the audience to understand the context.

Digital Story Telling's traditional seven elements can easily be adapted for LMOOCs.

The *Point of View* of the story brings forth the personal experience(s) of the author(s) who in the case of a language course are both the educator, who might or might not also be the course developer, and the learners.

It is often suggested the use of the first-person pronoun when presenting the story and of the second-person pronoun when addressing the audience, the learners, as it helps in centring the viewpoint of the digital story from the perspective of the individuals among the learning community (Moradi and Chen, 2019).

The *dramatic question* is a feature derived from fiction literature that serves in capturing the attention of the learners and initiate a reflection process that gradually pushes the learners forward and eventually leads them to the completion of their learning journey, where questions are answered, and doubts resolved.

*Emotional content* is one of the most compelling elements of DST. It speaks directly to the learners and connects the general plot of the story to their personal experiences.

In a language course, the emotional content often materialises in the authenticity of learning tasks and the relevance the story told has for the individual lives of the

<sup>2</sup> [www.storycenter.org](http://www.storycenter.org)

TABLE 1 Digital story telling's seven principles, adapted and simplified from Robin (2006).

Principle of DST	
Point of view	The author's perspective
A dramatic question	A question that will be answered by the end of the story
Emotional content	Relevant content that reaches the audience in a personal way
Your voice	A way to personalize the story to help the audience understand the content
Economy	Balance in content, enough to tell the story without overloading the audience with too much information
Pacing	Related to Economy. Specifically: How slowly or quickly the story progresses
Soundtrack	Music or other sounds that support the storyline

learners (Arroba and Acosta, 2021). Identification is a powerful aspect of emotional content and relates directly to authenticity and relevance (Arroba and Acosta, 2021, p. 324). Learners need to somewhat identify with the story for learning to occur (Nair and Yunus, 2021; Maravelaki and Panagiotidis, 2022).

Using *Your Voice* to express the emotional content of a story and contribute to the learning community is paramount in DLEs in LMOOCs (Maravelaki and Panagiotidis, 2022). Hence, the language course should be designed to encourage and allow learners to share and personalise their stories about their learning journey (Arroba and Acosta, 2021).

The last three elements of DST might perhaps be considered of marginal importance. However, they can help tighten the structure of the course.

*Economy*, for instance, is a practical advice; it is best not to overload the story with unneeded information and tedious details. Brevity and a “to the point” message are key elements of digital content production.

Directly related to the economy of the story is its *pacing*. The story and content of the course should be constructed to allow individual progression, as learners are all different and should learn at their own pace.

Finally, incorporating music or other kinds of sounds (*soundtrack*) into the course can support and enhance the storyline and the depth of the narrative. It might add an extra dimension for language learners to explore, as they can get better acquainted with the culture of the target language through music.

## Norwegian for beginners

Combining elements of Connectivism and DST in the course series of NfB to create a cohesive and harmonic learning design was not an easy task.

The narrative chosen in the course series was relatively simple and implied some well know principles of language didactics. Learners had to familiarise themselves with the challenging situation of learning a completely new language with no other prior knowledge.

The challenge of online language courses resides within the very definition of what learning a language implies.

According to the Common European Framework of Reference for Languages (CEFR), increasingly used also in countries outside Europe, the categorisation of the linguistic competence of a language learner and the user is based on real-life language use and grounded in interaction and co-construction of meaning (Council of Europe, 2017). Language Learning is “[...] mainly skill-based, in that it involves putting into practice an intricate array of receptive, productive, and interactive verbal (and non-verbal) functional capabilities” (Martin-Monje and Bárcena, 2014). In other words, language is contextual and must be learned contextually. It needs a background story to happen. Consequently, the course needed to offer learners a credible scenario they could relate to so that the tasks of learning a new language would be less daunting.

Hence, the narrative featured a half-Norwegian half-French family, the Vidals, in the process of moving to Norway. Learners were invited to partake in the story and learn Norwegian with them, as the French members of the family were attempting to do the same. In this context, the narrative of the fictitious characters in the story, though perhaps different in biographic details, would overlap with the narrative of the learners trying to learn Norwegian. Cultural references on “how to live” in Norway and about the Scandinavian/Norwegian lifestyle, customs, and traditions were also included as a part of the general narrative.

An inclusive DLE was built to host the learning content where the learners were able to easily navigate the language resources on their own, and the learning activities would encourage collaborative learning. The presence of the lead educator on the course, although marginal, was marked in the texts and exercises by personal comments and by directly approaching the learners with questions and invitations to further discuss course content, doubts, and remarks together with the rest of the learning community.

Texts (in different formats) and exercises followed a progression along with the main narrative of the story characters but were at the same time independent units that could be revisited and revised by the learners at any time. All learning resources were therefore framed within the main narrative and were interconnected by internal links to other parts of the course to create a logical red thread throughout. It was then possible for the learner to browse and access the course content back and forth when needed and as they preferred according to their learning style.

## Materials and methods

To answer the research questions presented in the introduction, it was paramount to employ a research approach that could allow taking advantage of and include the quantitative data generated by FL's Learning Analytics as a first step to explore and deepen the scope of the inquiry by gathering richer qualitative data from interviews with the course participants.

A hybrid research design in the form of a Mixed-Methods explanatory sequential design (Creswell and Plano Clark, 2018) was chosen, starting with a descriptive quantitative part, and followed by a qualitative Mixed-Method Grounded Theory (MMGT) study (Guetterman et al., 2019; Johnson and Walsh, 2019). This article focuses on the qualitative part of the study. Nonetheless, when presenting the results, extracts from Learning Analytics will also be referred to and represented in graphs to give a general idea of the quantitative data from FutureLearn. A [Supplementary Appendix](#) showing a summary of the results from Analytics is provided separately.

Together with MMGT as a methodology, the Constant Comparative Method of Analysis (CCMA) (Corbin and Strauss, 2008, 2015) was chosen to organise and guide data analysis because of its wide versatility and rigour. CCMA is first and foremost meant to contribute to new theory development (theoretical analysis) but it is also widely employed to give a thorough description of a phenomenon (descriptive analysis) (Bryant and Charmaz, 2007; Clarke, 2007; Clarke and Keller, 2014; Postholm, 2019). Both aspects are central to this research. By answering the research questions based on hypotheses grounded in the quantitative data from Learning Analytics, it would be possible not only to understand more of the phenomenon *per se* but also to confirm or discard those hypotheses and come to a more general conclusion. This in turn would help to lay the foundations for a theory development about which kind of learning design is best to adopt in LMOOCs.

### A note on mixed-methods grounded theory

The appeal of Mixed Methods Research (MMR) resides in the integration and use of both quantitative and qualitative types of data at different levels and stages of the research design to best address the purpose of a research study and offer a broader understanding of a phenomenon (Guetterman et al., 2019). Usually, it is possible to identify three core designs in MMR, convergent, explanatory sequential, and exploratory sequential (Creswell and Plano Clark, 2018). However, there are numerous classifications available (p. 58), and because researchers neither seem to agree on a definite framework or model for the paradigm nor at which level of the paradigm itself (ontology, epistemology, methodology, or methods) the mixing

should take place, some authors have in recent years started advocating for new taxonomies, more diverse and better apt at describing the different study designs MMR can concretise into (Ivankova and Plano-Clark, 2018). In the overwhelming inflation of MMR approaches, it is possible to find the linking to Grounded Theory methodology (GT). Since its original definition by Glaser and Strauss (1967), GT has evolved from being a methodology, or research approach, into a “meta-theory of inductive research design” (Johnson and Walsh, 2019, p. 3; Walsh, 2014, 2015) where in recent years, a strong tendency has emerged in applying both quantitative and mixed qualitative and quantitative data (pp. 3–4). This evolution has led to a research approach that combines elements from both MMR and GT to develop namely a MMGT anchored in both quantitative and/or qualitative data (Johnson and Walsh, 2019, p. 8). Because this proposed unified understanding of GT and MMR is fairly recent, there is not yet a consensus on the definition of what MMGT would entail. However, Gregor's, (2006, p. 616) broader definition of theory might help in defining the contours of MMGT as an all-encompassing attempt to understand the world by “analysis and description, explanation, prediction, and/or prescription, which lead to five types of theories that are interrelated: analytic, explanatory, predictive, explanatory and predictive, and theory for design and action.” By Gregor's open definition, MMGT defines itself as a methodology where one can conduct both exploration and confirmation (Johnson and Walsh, 2019, p. 4) providing not just a deeper understanding of the world but also the justification for actions and interventions in the world, and more general predictions about future developments. Another useful aspect of MMGT is the possibility to consider both nomothetic (general) and idiographic (local) levels of a studied phenomenon/reality in order to reach the statement of a practical theory, that is a “theory [which] is a somewhat general (e.g., middle range) theory that works in practice (i.e., in particular, local contexts and situations, with particular people)” (Johnson and Walsh, 2019, p. 8). The higher level of flexibility and creativity offered by this research approach makes it not only interesting but also potentially a better approach to investigating the complexity of phenomena in modern society.

### Research actions and data gathering (cf. [Supplementary Appendix A–G](#))

Due to the large number of course participants in NfB, the collection of data material for the MGT part was narrowed down by designing an *ad hoc* survey that was sent to a specific group of course participants on FutureLearn. In this case, the GDPR policy followed by FL allowed to contact only the participants that had taken the last run of the course series at the requested date and had accepted to receive advertisement and announcement emails from FL; that



amounted to 2,500 participants out of almost 42,000 total course participants.

Being the scope of the qualitative inquiry to better understand and give deeper meaning to the quantitative starting results from platforms' Learning Analytics, an even smaller participant sample was then seen as a necessity, to elicit more useful data from interested participation. The *ad hoc* survey, therefore, invited the participants to a follow-up interview. An open-end part with free text was also included to start eliciting some qualitative data from course participants together with the quantitative responses. Out of the 45 respondents to the survey, eight agreed on being interviewed during the next 6 months. The research project was then presented to and accepted by NSD, the Norwegian Centre for Research Data.

Sampling in qualitative research is often a topic of debate, unfortunately yielding inconclusive results. In traditional GT and also in MMGT, scholars have taken different positions in sample sizing with an emphasis on the concept of "saturation" (Cunningham and Carmichael, 2017). The literature seems to suggest qualitative sample sizes between 5–6 and max. 30–35 respondents (Cunningham and Carmichael, 2017) with Charmaz (2014) arguing that even the smallest sampling still can produce a study of lasting significance given the quality of the interviews and the depth of the analysis. Samples should be large enough to produce meaningful data but not so large that data become redundant (Cunningham and Carmichael, 2017). The concept of data saturation, however, can be elusive in that it does not seem to provide enough practical guidance for estimating sample size prior to data collection (Aguboshim, 2021).

With eight interviewees, this study might lie in the lower scale of sample sizing regarding interviews, but the qualitative data are corroborated by an additional 45 samples of free texts collected through the *ad hoc* survey. The total qualitative sample collected should therefore be sufficient to answer the research questions.

The general demographics from platform Analytics show that most of the course participants across NfB's all courses and runs were women, aged 25–35, predominantly from or based in Europe (with a prevalence living in the United Kingdom, Norway, and Northern Europe) and the United States. This information regards solely the country of residence, not the country of origin of the participants.

Most of the participants usually are fully employed. The prevalence of female and in-work learners seems to resonate with general empirical data from MOOCs providers, even if it is difficult to find conclusive results in the research literature (Dai et al., 2022).

This reflects somewhat in the participants interviewed in this study.

The participants in question were only those who previously had given consent to participate in the initial survey and had positively replied to the interview invitation. In this way, one could say that the participants were self-selected, in that only those who showed an interest were interviewed. All of them were based in European countries, and none of them was native speaker of English, but all spoke English at a very good level as this is a prerequisite for following courses on FL. Six out of eight were speakers of several foreign languages (two or more in addition to their mother tongue) and routinely participated in language courses, both traditional face-to-face, and online courses, for personal development and a general interest in language. All were fully employed, and many were language teachers or worked with languages as translators. These were competent and experienced participants who were able to share their reflections and reply with precision to the questions asked. All seemed to have a strong interest in the Norwegian culture, and some of them had previously been in Norway for study and/or vacation and wished to come back and perhaps move permanently.

The interviews with the participants were conducted in the summer of 2021. Eight ( $N = 8$ ) semi-structured interviews (Corbin and Strauss, 2015, pp. 38–40) were conducted: three ( $N = 3$ ) participants were males and five ( $N = 5$ ) females. In the interviews, the topic revolved around the course's narrative structure and the story frame around the Vidal family. An interview guide with three simple questions was followed as a starting point, and the participants were then encouraged to speak freely:

1. What is your opinion about including fictional characters in the course and following their story?
2. Was the course narrative interesting and/or relevant to you? And could you explain in which way yes or no?
3. What are your thoughts about the interconnection, the link between texts, grammar, and cultural resources with the storyline about the Vidals?

## Data analysis

The analysis of the data started in the autumn 2021. The (Supplementary Appendix A–G) gives an insight into the analyzed data materials. According to Thornberg and Charmaz (2014) and their constructionist point of view, the abductive approach in CCMA is strongly connected to the principle of the theoretical sensitivity of the researcher, where their active employment of previous knowledge and experiences can tether the scope of the investigation in the definition of concepts, categories, and the coding process. This abductive approach allows for the selection or invention of hypotheses that can explain a particular empirical case or set of data better than any other candidate hypotheses (Thornberg and Charmaz, 2014,

p. 162) and guides the data collection and analysis from the very beginning, from the definition of the main categories and subcategories to a core category supporting theory development.

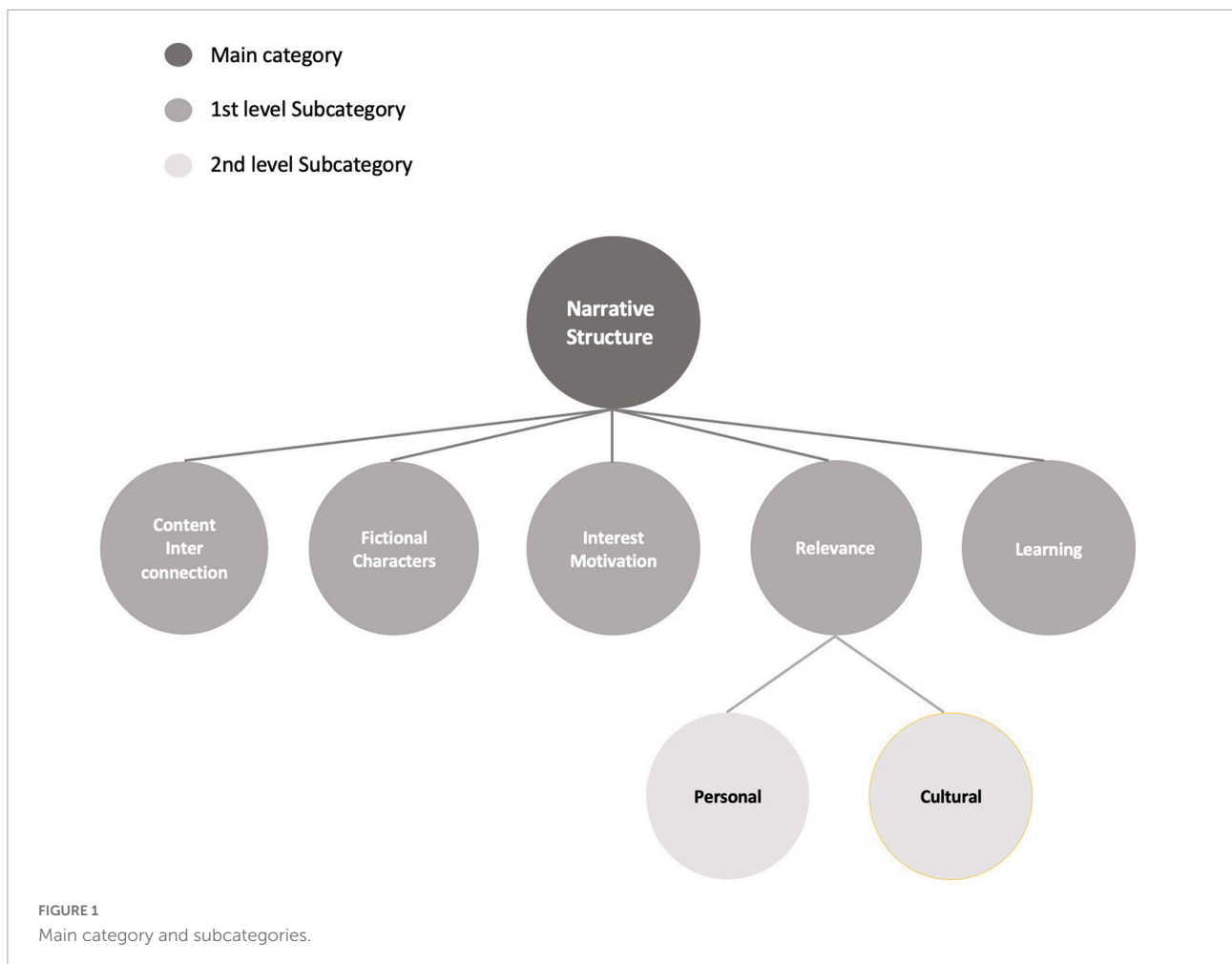
In this analysis, the NVivo software was used to ease the analytical process. Each participant's interview and all free text samplings from the initial *ad hoc* survey were structured in "files" with IDs, and each file/ID was thoroughly read and analysed by Open coding. This implies both categorisation of blocks of information from the data, like a series of sentences or paragraphs, and labelling through "codes." When analysing the files, one codes "as one goes along" and at any given time in the process, it is possible to rearrange the order of categories and sub-categories, create new codes and/or eliminate those which are not relevant anymore and explore interconnections among categories.

**Figure 1** visualises the code tree for the categories that emerged as the most relevant during data analysis.

The main category Narrative Structure and its sub-category Content Interconnection reflected the didactical choices at the heart of the course design and were therefore co-dependent. The content interconnection was a manifestation

of the narrative structure and run throughout the course series (every learning resource was both connected to the narrative structure of the course and interconnected with each other). These were also the categories that presented the highest code density in NVivo, meaning that most of the data from participants' interviews could be coded into these categories.

In the stage of Axial Coding, connections between categories and sub-categories were then made vertically exploring which sub-categories seemed to present a logical connection, which of them stood intuitively in relation to one another, and how that relationship could be explained. Because the research questions hypothesised the embedded narrative structure of NfB as a potential factor that contributed to the courses' positive results, the sub-categories that could help in elucidating that aspect were hence analysed. The sub-categories "Relevance," "Interest and motivation," and "Learning" appeared to be intrinsically related to each other from a didactical point of view and seemed the best candidates to elucidate whether and how the interconnected narrative structure of the course could have had some influence on the participants' perception of relevance, motivation, and



learning. Had the narrative structure of the course been relevant to the participants in some ways? If yes, would the relevance of the narrative structure have had an impact on the participants' level of interest and motivation? In which way? More on a personal level? Or on a cultural level of interest? And would this aspect in any way have influenced their perception of learning? Did the narrative structure of the course play a role in how participants related to the course content? In what way?

The interconnections between the chosen categories/subcategories/codes across all references were analysed and the results were progressively condensed.

## The core category

From the final phases of the qualitative data analysis, the categories "Narrative Structure" and "Content Interconnection" stood out as the best candidates to constitute the core category. However, choosing but one of the two seemed extremely difficult and, in a way, constructed. The relationship between them was too co-dependent. If one had to describe, in a classic Corbin and Strauss (2008, 2015) line, which of these two categories seemed to encapsulate the data most efficiently at the most abstract level and had the strongest explanatory power, one would have had to put "Narrative Structure" as the driving force that powered the success of NfB. However, in doing so, the decisive impact of the "Content Interconnection" aspect in creating a cohesive course series would have been missed. Looking for more creative ways of solving this conundrum, Charmaz and her constructivist version of GT rooted in pragmatism and relativist epistemology (Thornberg and Charmaz, 2014, p. 154) came again to hand.

When examining and comparing the research literature and the paedagogical thought that had sparked the modelling of the course against the code tree that had taken form during analysis, the fundamental principles of Connectivism and Digital Storytelling seemed to resonate throughout the categories described in the code tree. They seemed embedded in all the codes and therefore could account for all data expressed through categorisation. Again, the pragmatism of abduction helped in the realisation that a major core category, in this case, had to include the perspectives posed by Connectivism and Digital Storytelling in the development of a theory grounded in the data (Reichert, 2019). By creating a core category named Connectivist Digital Storytelling, it would have been possible, on one hand, to account for the open nature of the content interconnection of the course, which transcended its boundaries to relate to the outside world and the learners' real-life and authenticity of resource sharing. On the other hand, and at the same time, the key value of the narrative side of the course as a creative force and a conductor for learning could have been effortlessly included. In this

way, one could obtain what (Charmaz and Thornberg, 2020, p. 16), quoting Strauss and Corbin (1998), call "empirical grounding," when a theory and its concepts fit with the data.

Figure 2 illustrates the most relevant categories for the analysis including the Core Category.

## Results and discussion

By comparing the results from the qualitative study against the initial quantitative data from Learning Analytics, and against relevant literature, the hope was that the qualitative part of the study could better elucidate and elaborate on the quantitative data and serve as an indicator of whether the initial hypotheses could have some substance.

Data analysis seemed to corroborate the initial hypotheses.

In the following, the *qualitative* results from the study are first summarised briefly in Table 2 before being presented and discussed in depth in two thematic sections.

The first section will answer the first research question and accounts for the participants' response to the course's narrative structure revolving around the Vidal Family.

The second section will answer the second research question and present a deeper insight into the relationship between the content interconnection of the course and its relevance for the participants with a focus on the aspects of motivation and learning.

Results in the sections will be presented in running text and include quotations from the participants.

Finally, the qualitative results will be discussed against the preliminary *quantitative data* and against relevant literature.

## Section 1: The narrative structure and the Vidals

The progressively condensed text across all interviews including the free texts from the initial survey seemed to make clear that the realistic narrative of the course, by presenting the daily family life of the Vidals as they were moving to Norway, added interest to the course content. It was a source of inspiration and motivation. It encouraged course participants to learn more about Norwegian culture and language because they could relate, personally or out of intellectual interest, to the storyline unfolded in the learning materials. The narrative introduced new perspectives represented by the different characters of the Vidal family, and it acted as a platform to convey experiences and knowledge about the Norwegian language and culture.

The realistic narrative and the interconnection throughout the course, between the grammar resources and the cultural resources providing insight into important aspects of living in Norway, seemed to have had a positive influence on learners’ motivation, and consequently, a positive impact on their language learning (everyday language use).

The research literature on the link between motivation and learning also seems to validate current results. When learners engage with learning materials that are relevant to their lives, or authentic, their motivation increases and positively impacts their learning (Parker et al., 2013; Albrecht and Karabenick, 2018; James et al., 2020; Roman et al., 2020). What it is defined as *relevant* is of course subjective and can be anything

from intellectual interests, perceived authenticity of the learning materials, and/or a represented situation that can mirror participants’ live phases. One of the participants explains:

*“I think it is very important in these courses to have a conductor line, that is, a family, which is the specific theme of your course, or a group of friends, or some parts of the history of the country or whatever other tools that may help students to reach their goals and make the course fun and entertaining” (ID 4).*

It is a consistent finding that the course participants responded positively to the specific storyline about the Vidal

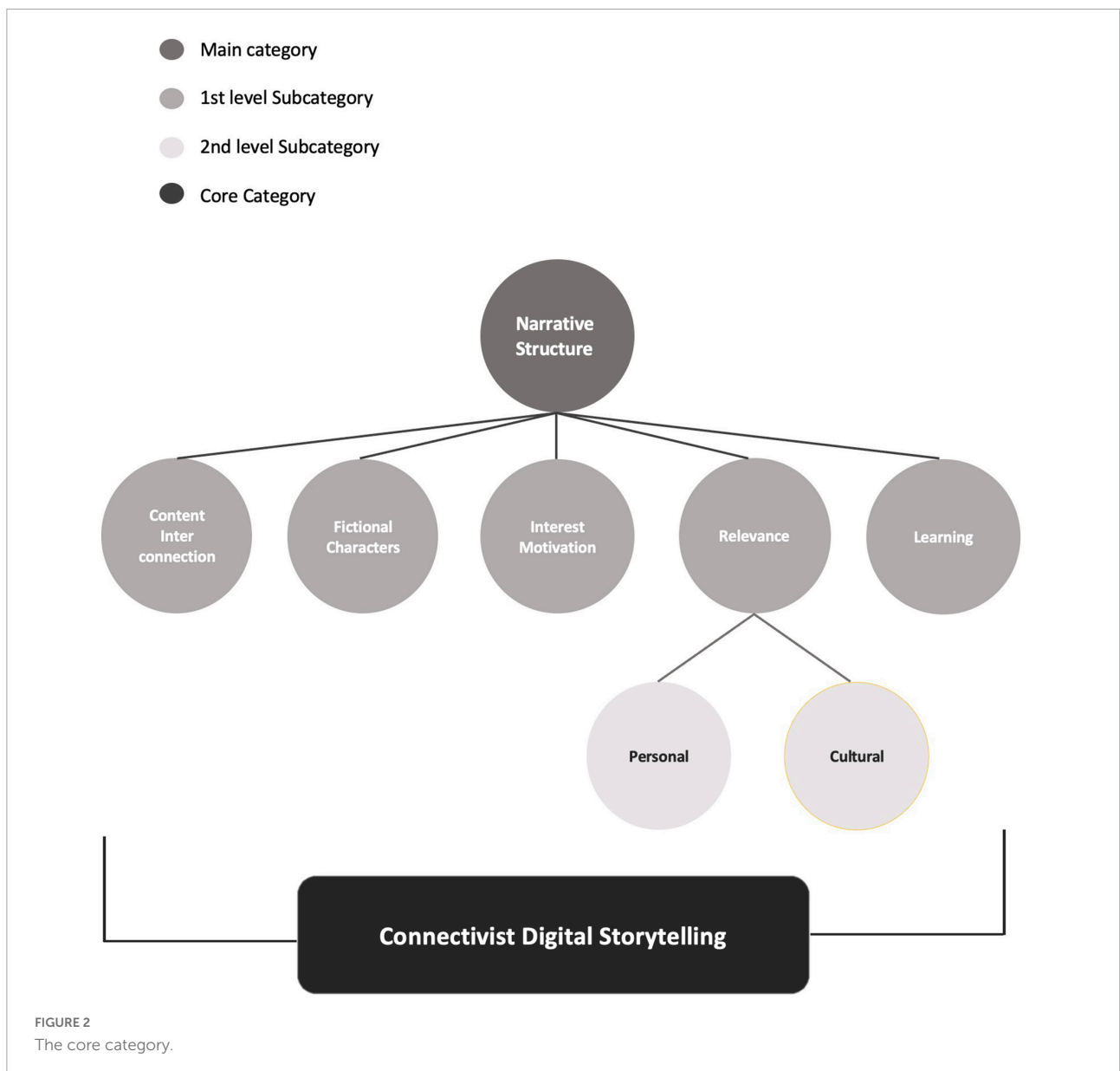


FIGURE 2  
The core category.

family in the process of moving to Norway. This quote summons it up:

*“The Vidal family narrative was realistic and interesting and developed over the duration of the course. I could relate to the parents whose jobs and home lives were a vital part of the discourse. The viewpoints of the teenage daughter, Dina, a typical teenager and her younger brother, Alex, a barnehagestudent, added spice to the family dynamic. It was nice to have brought in the grandparents especially for the holiday celebrations. A person is already interesting as a prime cut steak, but a multi-generational family heightens interest to the level of a six course meal!” (ID 2).*

## Section 2: Content interconnection, with a focus on relevance, motivation, and learning

Because the narrative frame was meant to encompass the entire NfB project, from the first to the third final course, the content interconnection was a specific feature of the series. It intertwined the storyline about the Vidal family with the learning resources about the Norwegian language and culture. This interconnection between the language, the culture of the country and an entertaining storyline with familiar characters (even so fictional) with whom learners could identify, seems to have been quite important in approaching the study of the language.

### Relevance

Cultural resources presenting, for instance, the reality of living as an ex-pat in a foreign country, seemed to have made the learning experience more interesting and encouraging. The focus on a “real situation” made language learning more relevant. As one participant remarked, learners often start learning a foreign language due to their interest in the culture (ID 4). Also, the identification mechanism with the characters made the learning of the language less cumbersome, consequently facilitating the learning process:

*“[...] many times the grammar parts (which are necessary, but often the least fun part of learning a new language) were conveyed in subtle ways and interwoven into the Vidal Family story. So, you learned the grammar by seeing its application in a lovely family story. The Vidal narrative definitely had influence and impact on my learning. Because I connected with the family, I completed more parts of the lesson consecutively. I was curious where and what they would do next, so I persevered through more lesson sections on given days.” (ID 2).*

### Motivation and learning

The dialogues in the course exemplified linguistic topics through examples from cultural situations and dialogues in daily life. Multimodal content presentation through written texts, audio/video, pictures, and the cohesive and realistic narrative frame based on life-like examples and characters one could relate to, created a sense of continuity and unity to the course, made language learning more relevant and helped in facilitating the learning of vocabulary and prosody, and language in context:

*“I thought the interconnection was very good and did not become bored with the material presented. I appreciated the links to cultural and social resources, for example, the links to school information and to working within Norway. The links provided inspired me to look further at other links, including museums, cultural events, etc. Yes, I do think that the ongoing Vidal narrative impacted my learning because I could better understand everyday usage of the language. The various settings-work, home, school, leisure time gave me insight into life in Norway.” (ID 5).*

Good examples were crucial to making the course content more relevant. The interconnection of theoretical knowledge and practical examples put everything in a clearer context and seemed to help the learners in understanding better the meaning of each lesson and its relationship with the rest of the course elements. It created continuity and a cohesive environment for language learning in context instead of compartmentalised knowledge, as two other informants report:

*“I particularly enjoyed the audios/videos from the Vidal family, it really helped me get used to the intonations in Norwegian and it was nice to hear examples of daily conversations instead of just loose words and phrases every now and then.” (ref. 14 open-end survey).*

*“It kept the continuity, so you didn’t feel. oh, ok so this is what I’m going to learn now. [...] We had a bit of an introduction with each character’s story and from that started learning what we had heard about in the context. I really liked the context, having context for each sort of thing we were going to learn. Instead of just learning from scratch, it was nice to see the examples before and seek the understanding from the context, the story and everything and then say ‘oh! That’s why this and that word are written that way or... [...]’” (ID 8).*

Also, links and updated references to authentic learning materials and resources outside the course frame seemed very

important for learning new vocabulary and expanding one's knowledge:

*"It makes it easier to learn. You can follow the characters from different angles. It's up to date, you can have all the basics in an interesting way and if you want to know more from the articles you can read further and that's what I really liked as well. The link to different proper websites, up to date material. [...] It put things in context so it means that you could remember the vocabulary better." (ID 7).*

## Discussion

To better answer the research questions, the relationship between the qualitative results from the interviews and the quantitative results from Learning Analytics was considered and analysed. The statistic graphs and visualisations from Learning Analytics ([Supplementary Appendix](#)) offer a quick and direct insight into the key performance elements of the course series NfB. They report *what* happened in pictures and numbers. The qualitative results add yet a deeper dimension to understanding and share light on *why* things might have happened in a certain way.

This section is therefore an attempt to illuminate this relationship and discuss the relevance of qualitative data analysis to further elucidate and understand the quantitative data from Learning Analytics. In doing so, the pivotal role of the core category in guiding this understanding is also highlighted.

FutureLearn's data dashboards, like the one illustrated in [Figure 3](#), collect downloadable results about how NTNU's NfB 1, 2, and 3 performed compared to other FutureLearn courses in the same subject area of Language Learning. These aggregate datasets automatically produced by the platform allow course developers to better benchmark their course's

performance against platform-wide activity and make data-informed decisions based on courses' past performances.

Given that Norwegian is a minimal language with a limited learner audience, nobody expected a large number of enrolments. Yet, datasets show that the three courses combined managed to attract a considerable number of participants, almost 42,000 learners, with a completion rate of over 14%. While these numbers might seem very low compared to other language courses like English or Spanish with hundreds of thousands of learners, it is important to remember that, unfortunately, the low completion rate in MOOCs is a common problem, and 90–95% of the students enrolled fall out of the course in their first week ([Moore and Wang, 2020](#)). A completion rate of 14% or more is, therefore, a very good score. The course series also collected an average of 88% positive feedback and presented a high participant retention rate with an average of over 70% of the learners funnelling through each course toward full completion.

Analytics stats show in addition that almost an average of 20% of the enrolments were *activated social learners* who posted comments in the forum area engaging in the learning community. Despite the seemingly low percentage, the value for activated social learners puts the course series actually above the average performance of other FL courses (visualised in green in the Analytics tables in [Supplementary Appendix](#)). And so does the value for positive feedback at over 88%.

These quantitative data combined with the qualitative results help answer both research questions regarding:

1. Whether and how the structure of the course could facilitate language learning from the participant's point of view, leading to better participant retention and higher completion rate?
2. Whether and how the development of a comprehensive narrative structure based on Digital Storytelling could

TABLE 2 Qualitative results summarised.

Participants' response to the narrative structure of the course	It is a consistent finding that the course participants responded positively to the specific storyline about the Vidal family in the process of moving to Norway.	The realistic narrative of the course, by presenting the daily family life of the Vidals as they were moving to Norway, added interest to the course content. It was a source of inspiration and motivation. It encouraged course participants to learn more about Norwegian culture and language because they could relate, personally or out of intellectual interest, to the storyline unfolded in the learning materials. The narrative introduced new perspectives represented by the different characters of the Vidal family, and it acted as a platform to convey experiences and knowledge about Norwegian language and culture.
Relevance of course content interconnection for the participants' perceived motivation and learning	It is a consistent finding that the course content interconnection had a positive impact on the participants' learning experience.	The interconnection of the comprehensive narrative structure with the course's cultural and linguistic resources seemed to have been paramount in approaching the study of the language. The focus on a "real situation" linked for instance to cultural resources presenting the reality of living as an ex-pat in a foreign country made language learning more relevant, and the learning experience more interesting and encouraging. Also, the identification mechanism with the characters seemed to have made the learning of the language less cumbersome, consequently facilitating the learning process.

## Stats dashboard

DATASETS    COURSE MEASURES    TOTALS    BY WEEK

Reporting period ends on 30 May 2021 UTC.

- **Archetype Survey Responses** 90.1 KB last updated 10 Sep 2020
- **Campaigns** 109 KB last updated 11 Sep 2020
- **Comments** 2.26 MB last updated 10 Sep 2020
- **Enrolments** 1.45 MB last updated 11 Sep 2020
- **Leaving Survey Responses** 124 KB last updated 10 Sep 2020
- **Post Course Survey Data** 43.4 KB last updated 10 Sep 2020
- **Post Course Survey Free Text** 25.1 KB last updated 10 Sep 2020
- **Question Response** 33.6 MB last updated 10 Sep 2020
- **Step Activity** 14.6 MB last updated 10 Sep 2020
- **Team Members** 195 Bytes last updated 11 Sep 2020
- **Video Stats** 4.79 KB last updated 11 Sep 2020
- **Weekly Sentiment Survey Responses** 35 KB last updated 10 Sep 2020

FIGURE 3

Datasets from FutureLearn platform, course dashboard.

enhance the participant's learning experience in fully online self-paced language courses like LMOOCs?

When considering, for instance, the results on the value for activated social learners in relation to the *core category* of *connectivist digital storytelling* that emerged from the qualitative data, it is possible to achieve a deeper understanding of the reasons that led to such positive scores for feedback and total participant retention and completion rates. We can discern here a direct relationship to the pedagogical/didactical background the course design was built upon. The course components were indeed designed on the basis of an encompassing narrative structure and interconnectedness to encourage and promote collaboration and meaning exchange among participants, like open discussions where learners were asked to actively partake in sharing their opinion, life experiences, and their previous knowledge. The qualitative data illuminate the numbers and visualisation graphs in Analytics by giving them a context and showing that the course series seemed to have positively met learners' expectations on several levels. It responded well to learners' needs for new knowledge and the relevance of learning materials. Newly acquired knowledge and skills seemed also to have been positively integrated into the learners' life as learners both applied and shared with others on the platform what they learned on the course, hence, the above-average percent of activated social learners. Most learners seemed also to have

enjoyed the course despite the inherent difficulties of learning a completely new language. In that regard, several learners commented on the learning design by pointing out how the course structure and content organisation could intrinsically be linked to how learners interacted with the course content and perceived the development of their learning. Many commented explicitly both in the interviews and in the free texts from the survey that the red thread of a narrative frame throughout the course had helped learners foster a sense of connection and motivated them to complete the course series and pursue a deepening of their learning beyond the limitations of the actual digital learning space.

On one hand, the results from this study seem to confirm much of what previous studies on MOOCs, LMOOCs, and about Connectivism and Digital Storytelling have discussed *separately*.

The connectivist approach in establishing DLEs in MOOCs and LMOOCs has been confirmed to foster student-centred learning and students' development of critical thinking skills and digital literacies (Foroughi, 2015). The use of EDS for Language Learning (Wu and Victor Chen, 2019) seems also to have had a positive impact on improving students' language learning and collaboration skills (Moradi and Chen, 2019; Arroba and Acosta, 2021). Also, a recent study has considered the specific integration of DST in the instructional design of an LMOOC (Maravelaki and Panagiotidis, 2022) in a way that might resemble our approach but without the presence of a

narrative structure around the course content, and without yet having had the time to conduct an evaluation study of the course in question.

On the other hand, it has been very difficult, or not possible at all, to find studies that have investigated the synergy of all those aspects *together* and within the frame of a mixed research paradigm where both quantitative and qualitative results have been analysed. It has also been very difficult to find studies presenting a concrete framework for developing LMOOCs according to the principles of Connectivism and DST.

Although there are different models for instructional design in MOOCs, there is still a lack of research in instructional design for computer-assisted language learning (Sallam et al., 2022). A systematic review of the published literature, however, seems to indicate that this is very much a topic of increasing interest due to the related importance for the development of participants' learning and the promotion of collaborative learning.

The emerging field of research in LMOOCs appears now to be mature for further studies and a clearer course of action.

## A learning design framework for more engaging language massive open online courses?

It is this author's belief that the concretisation of a theoretical framework for Instructional Design in LMOOCs based on principles of Connectivism and Digital Storytelling could be useful to educators and online course developers to foster and promote course participants' learning.

As previously mentioned in the methodology section, pragmatism and abduction (Thornberg and Charmaz, 2014; Reichertz, 2019) have been decisive approaches during the analytical work. Establishing a core category to be the focus of theory development also has a pragmatic aspect. It speaks of an intention to action that goes beyond the mere description of a phenomenon (Creswell and Poth, 2018, p. 82). There are different ways of intending a theory. Previously, Johnson and Walsh's (2019) concept of practical theory was referred to and echoed by the inclusion of Strauss and Corbin's (1998) and Charmaz and Thornberg's (2020) principle of empirical grounding. Theory can take many forms, it can be presented as a diagram, as propositions (or hypotheses), or as a discussion (Strauss and Corbin, 1998). It can also be developed "by piecing together implicit meanings about a category" (Creswell and Poth, 2018, p. 84), as is the case for this study.

By placing the core category of *connectivist digital storytelling* at the centre of the theory, the implicit meaning of those related underlying concepts was also pieced together; the network learning principles of Connectivism (Siemens, 2004), the online-based learning resources, and the red thread of a

narrative to be shared with the learners in the spirit of Digital Storytelling (Robin, 2006).

These are both theoretic and practice-based didactic pillars necessary when designing online LMOOCs. They also express concepts and hypotheses that can "fit" with both the quantitative data from Analytics and the qualitative data from this study.

In this final section, therefore, a theory is concretised in the form of a Framework for Digital Learning Design in LMOOCs based on Digital Storytelling and a connectivist approach to language didactics.

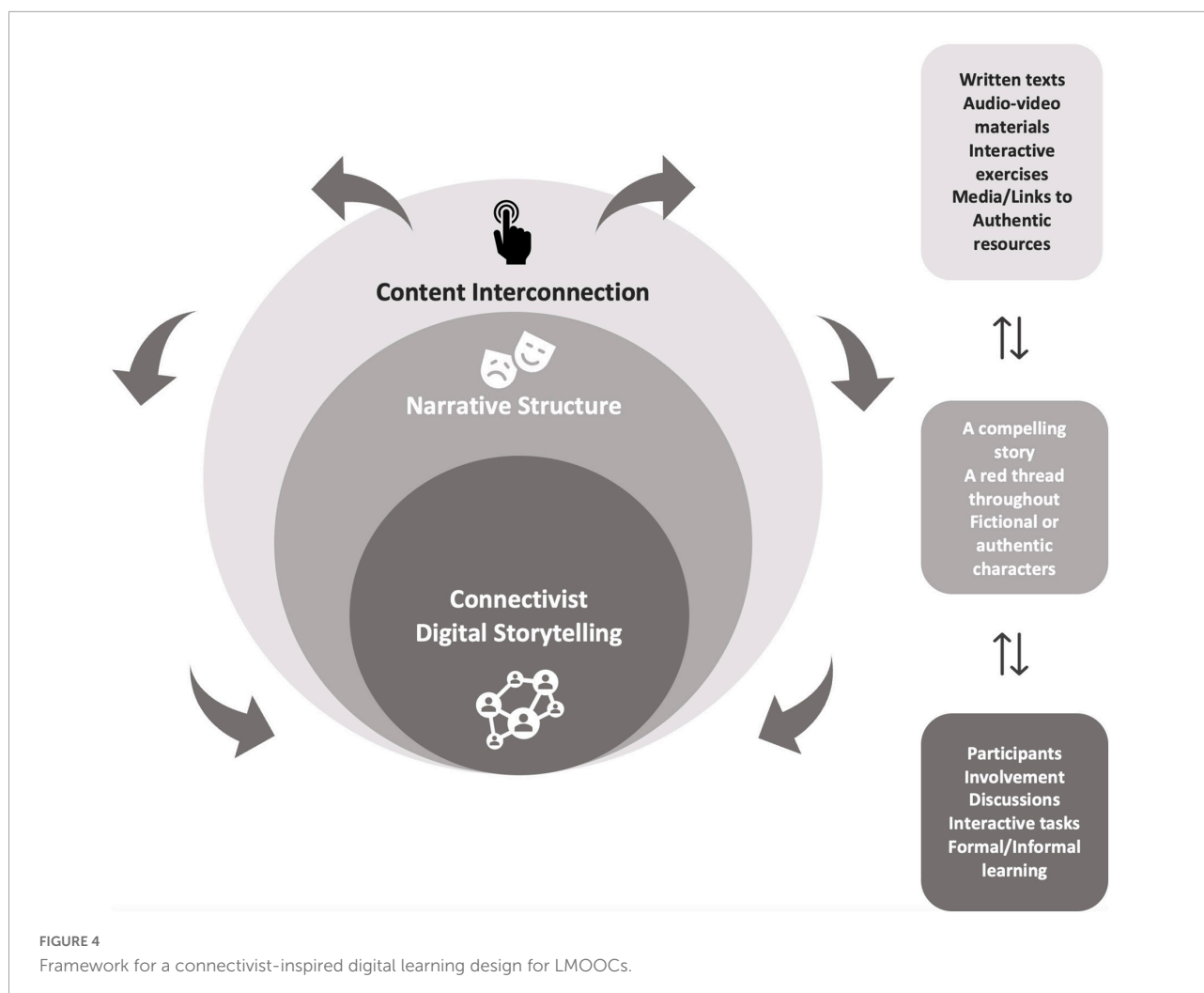
This framework summarises the results of the study and at the same time serves as a springboard for further research. Figure 4 visualises the framework and is followed by a description of how the framework can be applied to LMOOCs.

## How to apply the framework to language massive open online courses

The suggested framework is meant as a tool for LMOOC developers and instructors to improve learning design practices and create courses that can support and promote participants' involvement within the course and interaction with the course material and fellow learners.

1. The core category of Connectivist Digital Storytelling lies at the very heart of the framework and learning design, and it encapsulates the theoretical and practical guidelines for the development of a LMOOC. Those guidelines are symbolically expressed through an icon representing a network of people, to put the learners at the centre of the learning design but also to express the symbiotic nature of networked learning where the boundaries between the learner and the teacher are rarefied, and the teacher is but a facilitator of knowledge flow, not the exclusive source of it. Because knowledge is found inside and outside of the traditional boundaries of a course, the principles of Connectivist Digital Storytelling at the base of the framework represent the establishment of an active learning community where learners are co-creators of knowledge and not mere recipients.
2. The second key element of the framework is the narrative structure, the storyline that is the practice-based foundation of the course design, and that in the figure, is represented by the icon for the theatre masks to indicate dramatisation and/or fiction. This narrative unfolds itself throughout the learning design and is both embedded and related to all the learning resources included in the course, from specific grammar features and theoretical/linguistic learning resources to cultural references and updated course materials online and links to authentic resources outside of the course. Elements borrowed from fiction





writing should then be included, like in the practice of Digital Storytelling.

3. The outer circle of the framework, finally, illustrates two pivotal aspects represented by the arrows and the icon of a hand clicking on a mouse cursor.

The hand clicking on the cursor indicates the interconnectivity of the course content throughout, and how every element is traceable and retrievable digitally from any location within the course itself in a well-orchestrated web of links. The circle shows the interconnection of the narrative with the learning materials in the framework, from the written texts to the audio and video materials, and the grammar exercises. At the same time, because this circle intersects and includes the core of the framework and the category of connectivist digital storytelling, this icon also opens the interconnection of the course content to the outside world of authentic learning resources, as indicated by the arrows pointing out of the circle, in a continuous and up-to-date exchange of knowledge and experiences between

teacher and learners, and among learners and their extended learning networks.

The arrows embracing the framework also reinforce this circular dimension of interconnectedness, and at the same time illustrate the recursive/iterative character of the framework as a process for course development. In a way, the framework is a reminder for the course developer and/or the educator that language learning entails much more than the study of grammar rules and a linear learning progression that “fits all.” Language learning is a continuous creative process, where the learner employs different abilities and strategies to understand, master, and become a proficient language user as well as a culture communicator. In this sense, an LMOOC can never be a complete, finished course. The development of a MOOC happens in recursive/iterative phases of creation, modification, and evaluation, hopefully in partnership with the learners. It must adapt to the learners and to the time and space they live in. It must take into consideration their needs and their feedback. The circular

form of the framework highlights expressively this recursive aspect of the process.

4. The boxes on the right in [Figure 4](#) illustrate the elements, learning objects, and learning activities, that concretise each circle of the framework, regardless of the target language featured in the course.

## Limitations and conclusion

Besides the fact that the proposed framework is at an early developmental stage and further refinement is undoubtedly necessary, one of the possible limitations of this study is that it relies on the work and analysis of one researcher alone being both the researcher as well as the pedagogue and developer of the course series NfB. Undertaking this research project in cooperation with other researchers would have benefitted from the potential contribution of different academic fields and different research traditions, and new points of view in interpreting the findings.

Multiple researcher triangulations ([Flick, 2019](#)) by some scholars are seen as a way to endorse the validity of the analysis process making the research and the results more credible and fruitful (p. 239). However, triangulation does not seem to be a prominent concept in GT methodology discussions ([Flick, 2019](#), p. 237). It is common in (M)GT and CCMA to compare data slices ([Glaser and Strauss, 1967](#); [Flick, 2019](#), pp. 239–240) against each other and against relevant theory to validate the analysis process along the way, as it has been the case for this study. Also, GT researchers often refer to a creative process of “intuitive discovery” in their analysis. However, [Flick \(2019\)](#) cautions wisely that the line distinguishing this “intuitive discovery” from what she provocatively calls “vague intuitionism” (pp. 224–225) is very thin:

“[...] younger researchers, in doing a Ph.D., often lack the expertise of Glaser, Strauss, Charmaz or 673 Bryant and are left alone to make creativity, abduction and discovery work in their research.” ([Flick, 2019](#), pp. 226, 674).

Discussing data with fellow researchers often opens a deeper understanding of the phenomenon under scrutiny and promotes reflection on one’s own research practice and further development in the researcher’s theoretical sensitivity and reflexivity ([May and Perry, 2014](#); [Dodgson, 2019](#)). The hope is that the results from this study might spark an interest in further research.

Given the scarcity of research works in LMOOCs, it was this study’s ambition to share some light on the complexity of some theoretical aspects involved, and on how it is possible for educators and course developers to create and deploy higher

quality LMOOCs to cater to learners’ needs and foster and promote their learning.

Including principles of Digital Storytelling within a connectivist theoretical approach for the establishment of sustainable learning environments in LMOOCs has been the starting point for the development of the course series NfB. Based on the remarkably positive feedback from the course series and supported by both quantitative data provided by the platform’s Learning Analytics and qualitative data gathered from participants’ interviews, this study seems to corroborate the initial hypothesis regarding.

1. How the development of a comprehensive narrative structure based on DST can enhance the participants’ learning experience in LMOOCs.
2. How such an interconnected narrative structure positively facilitates language learning from the participants’ point of view, leading to better participant retention and higher completion rates.

To exemplify and make it easier for educators, course developers, and researchers to employ and apply Connectivism and Digital Storytelling in the instructional design of LMOOCs, a theoretical framework based on the principle of Connectivist Digital Storytelling has been suggested and explained. It is this author’s hope the framework can be of help in developing higher-quality LMOOCs and further research in the field.

## Data availability statement

The datasets presented in this article are not readily available because open science at NTNU takes place within the frameworks of legislation, regulations, public policy, and the University’s governing documents. The Norwegian Centre for Research Data (NSD) stores all raw materials for this study. GDPR and Schrems II regulations are standard and apply all over Europe. However, in Norway there are restrictions on the nature of the data researchers are allowed to share. It is for example not allowed to share raw material from interviews as participants can only be de-identified, not completely anonymised. In addition, part of the data generated for this study are the propriety of FutureLearn and protected by GDPR. Requests to access the datasets should be directed to corresponding author.

## Ethics statement

The studies involving human participants were reviewed and approved by the NSD the Norwegian Centre for Research

Data. The patients/participants provided their written informed consent to participate in this study.

## Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

## Conflict of interest

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

## References

- Aguboshim, F. C. (2021). Adequacy of sample size in a qualitative case study and the dilemma of data saturation: a narrative review. *World J. Adv. Res. Rev.* 10, 180–187. doi: 10.30574/wjarr.2021.10.3.0277
- Albrecht, J. R., and Karabenick, S. A. (2018). Relevance for learning and motivation in education. *J. Exp. Educ.* 86, 1–10. doi: 10.1080/00220973.2017.1380593
- Allen, J., Rowan, L., and Singh, P. (2020). Teaching and teacher education in the time of COVID-19. *Asia-Pacific J. Teacher Educ.* 48, 233–236. doi: 10.1016/j.tate.2022.103750
- Anders, A. (2015). Theories and applications of massive online open courses (MOOCs): the case for hybrid design. *Int. Rev. Res. Open Distributed Learn.* 16, 39–61. doi: 10.19173/irrodl.v16i6.2185
- Arroba, J., and Acosta, H. (2021). Authentic digital storytelling as an alternative teaching strategy to develop speaking skills in EFL classes. *LEARN J. Lang. Educ. Acquisition Res. Netw.* 14, 317–343.
- Bell, F. (2011). Connectivism: its place in theory-informed research and innovation in technology-enabled learning. *Int. Rev. Res. Open Distance Learn.* 12, 99–118. doi: 10.19173/irrodl.v12i3.902
- Biesta, G. (2019). Teaching for the possibility of being taught. world-centred education in an age of learning. *English E-J. Philos. Educ.* 4, 55–69.
- Bonfield, C. A., Salter, M., Longmuir, A., Benson, M., and Adachi, C. (2020). Transformation or evolution? education 4.0, teaching and learning in the digital age. *Higher Educ. Pedagogies* 5, 223–246. doi: 10.1080/23752696.2020.1816847
- Bonk, C. J., and Lee, M. M. (2017). Motivations, achievements, and challenges of self-directed informal learners in open educational environments and MOOCs. *J. Learn. Dev.* 4, 36–57. doi: 10.56059/jl4d.v4i1.195
- Bonk, C. J., Lee, M. M., Reeves, T. C., and Reynolds, T. H. (2018). “The emergence and design of massive open online courses (MOOCs),” in *Trends and Issues in Instructional Design and Technology*, 4th Edn, eds R. A. Reiser and J. V. Demsey (Boston, MA: Pearson).
- Bonk, C. J., Lee, M. M., Reeves, T. C., and Reynolds, T. H. (eds) (2015). *MOOCs and Open Education Around the World*. London: Routledge.
- Bonk, C. J., Zhu, M., Kim, M., Xu, S., Sabir, N., and Sari, R. A. (2018b). Pushing toward a more personalized MOOC: exploring instructor selected activities, resources, and technologies for MOOC design and implementation. *Int. Rev. Res. Open Distributed Learn.* 19, 92–115. doi: 10.19173/irrodl.v19i4.3439
- Boyraz, S., and Ocak, G. (2021). Connectivism: a literature review for the new pathway of pandemic driven education. *Int. J. Innov. Sci. Res. Technol.* 6, 1122–1129.
- Bryant, A., and Charmaz, K. (2007). *The SAGE Handbook of Grounded Theory*. Thousand Oaks, CA: SAGE. doi: 10.4135/9781848607941
- Buhl, M., and Andreasen, L. B. (2018). Learning potentials and educational challenges of massive open online courses (MOOCs) in lifelong learning. *Int. Rev. Educ.* 64, 151–160. doi: 10.1007/s11159-018-9716-z
- Calderon, A. J. (2018). *Massification og Higher Education Revisited. Analytics and Insights*. Melbourne, VIC: RMIT University.
- Callejo-Gallego, J., and Agudo-Arroyo, Y. (2018). MOOC: valoración de un futuro. *RIED* 21, 219–241. doi: 10.5944/ried.21.2.20930
- Castrillo, and de Larreta-Azelain, D. (2014). “Chapter 5: language teaching in MOOCs: the integral role of the instructor,” in *Language MOOCs: Providing Learning, Transcending Boundaries*, eds E. Martin-Monje and E. Bárcena (Berlin: De Gruyter Open).
- Charmaz, K. (2014). *Constructing Grounded Theory*. Thousand Oaks, CA: SAGE.
- Charmaz, K., and Thornberg, R. (2020). The pursuit of quality in grounded theory. *Qual. Res. Psychol.* 18, 305–327. doi: 10.1080/14780887.2020.1780357
- Clarke, A. E. (2007). “Grounded theory: critiques, debates, and situational analysis,” in *The SAGE Handbook of Social Science Methodology*, (Thousand Oaks, CA: SAGE), 423–442.
- Clarke, A. E., and Keller, R. (2014). Engaging complexities: working against simplification as an agenda for qualitative research today; Adele Clarke in conversation with Reiner Keller. *Forum Qual. Soc. Res.* 15, 1–40.
- Corbin, J., and Strauss, A. (2008). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. Thousand Oaks, CA: SAGE. doi: 10.4135/9781452230153
- Corbin, J., and Strauss, A. (2015). *Basics of Qualitative Research. Techniques and Procedures for Developing Grounded Theory*, 4th Edn. Thousand Oaks, CA: SAGE.
- Council of Europe (2017). *The Common European Framework of Reference for Languages: 719 Learning, Teaching, Assessment. Companion Volume with new Descriptors*. Strasbourg: CoE.
- Creswell, J. W., and Plano Clark, V. L. (2018). *Designing and Conducting Mixed Methods Research*. Thousand Oaks, CA: SAGE.
- Creswell, J. W., and Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches*. Thousand Oaks, CA: SAGE.
- Cunningham, N., and Carmichael, T. (2017). “Sampling, interviewing and coding: lessons from a 725 constructivist grounded theory study,” in *Proceedings of the 16th European Conference on Research Methodology for 726 Business and Management Studies*, (Dublin: ACPI).
- Dai, H. M., Teo, T., and Rappa, N. A. (2022). The role of gender and employment status in MOOC learning: An exploratory study. *J. Comput. Assist. Learn.* 38, 1360–1370. doi: 10.1111/jcal.12681
- De Caro-Barek, V. (2019). “Innovation in Language Teaching and Learning,” in *Empowering learners for life in the digital age. OCCE 2018. IFIP advances in information and communication technology*, Vol. 524, eds D. Passey, R. Bottino,

## Publisher’s note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

## Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/feduc.2022.1007091/full#supplementary-material>

- C. Lewin, and E. Sanchez (Cham: Springer), 187–196. doi: 10.1007/978-3-030-23513-0\_19
- Dodgson, J. E. (2019). Reflexivity in qualitative research. *J. Hum. Lactation* 35, 220–222. doi: 10.1177/0890334419830990
- Dos Reis, A. (2017). Digital storytelling and technologies. *Open Educ. e-Environ. Modern University* 3, doi: 10.28925/2414-0325.2017.3.11923
- Downes, S. (2008). Places to go: connectivism & connective knowledge. *Innovate: J. Online Educ.* 5:6.
- Downes, S. (2012). *Connectivism and connective knowledge – Essays on meaning and learning networks*. Ottawa, ON: National Research Council Canada, 616.
- Downes, S. (2020). Recent work in connectivism. *Eur. J. Open Distance E-Learn.* 22, 113–132. doi: 10.2478/eurodl-2019-0014
- Dunaway, M. K. (2011). Connectivism: learning theory and pedagogical practice for networked information landscapes. *Ref. Serv. Rev.* 39, 675–685. doi: 10.1108/09097321111866686
- Escudero, A., and Núñez, A. A. (2017). Impacto del fenómeno MOOC: la personalización en la educación superior. *RIDE: Rev. Iberoamericana Para Invest. Desarrollo Educ.* 8, 279–310. doi: 10.23913/ride.v8i15.300
- Fidalgo-Blanco, A., Sein-Echaluce, M. L., and García-Peñalvo, F. J. (2016). From massive access to cooperation: lessons learned and proven results of a hybrid xMOOC/cMOOC pedagogical approach to MOOCs. *Int. J. Educ. Technol. Higher Educ.* 13:24. doi: 10.1186/s41239-016-0024-z
- Flick, U. (ed.) (2019). “From intuition to reflexive construction: research design and triangulation in grounded theory research,” in *The SAGE Handbook of Current Developments in Grounded Theory*, ed. U. Flick (Thousand Oaks, CA: SAGE Digital Edition). doi: 10.4135/9781526436061.n8
- Foroughi, A. (2015). The theory of connectivism: can it explain and guide learning in the digital age *J. Higher Educ. Theory Practice* 11–27.
- Glaser, B., and Strauss, A. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Mill Valley, CA: Sociology Press. doi: 10.1097/00006199-196807000-00014
- Gregor’s, S. (2006). The nature of theory in information Systems. *MIS Quarterly* 30, 611–642. doi: 10.2307/25148742
- Guetterman, T. C., Babchuk, W. A., Howell Smith, M. C., and Stevens, J. (2019). Contemporary approaches to mixed methods- grounded theory research: a field-based analysis. *J. Mixed Methods Res.* 13, 179–195. doi: 10.1177/1558689817710877
- Ivankova, N. V., and Plano-Clark, V. L. (2018). Teaching mixed methods research: using a socio-ecological framework as a pedagogical approach for addressing the complexity of the field. *Int. J. Soc. Res. Methodol.* 21, 409–424. doi: 10.1080/13645579.2018.1427604
- James, N., Humez, A., and Laufenberg, P. (2020). Using technology to structure and scaffold real world experiential learning in distance education. *TechTrends* 64, 636–645. doi: 10.1007/s11528-020-00515-2
- Johnson, R. B., and Walsh, I. (2019). “Mixed grounded theory: merging grounded theory with mixed methods and multimethod research,” in *The SAGE Handbook of Current Developments in Grounded Theory*, ed. U. Flik (Thousand Oaks, CA: SAGE Digital Edition), 517–531. doi: 10.4135/9781526436061.n27
- Kop, R., and Hill, A. (2008). Connectivism: learning theory of the future or vestige of the past? *Int. Rev. Res. Open Distance Learn.* 9, 1–13. doi: 10.19173/irrodl.v9i3.523
- Lambert, J. (2013). *Digital Storytelling - Capturing Lives, Creating Community*. London: Routledge. doi: 10.4324/9780203102329
- Lid, S. E. (2013). *Learning Analytics - Automatisert Kvalitetssikring av Utdanning*. Norway: NOKUT.
- Liyaganawardena, T. R., Adams, A. A., and Williams, S. A. (2013). MOOCs: A systematic study of the published literature 2008–2012. *Int. Rev. Res. Open Distrib. Learn.* 14:202.
- Lohr, S. (2020). *Remember MOOCs? After Near Death, they’re Booming*. New York, NY: The NY Times.
- Maravelaki, S., and Panagiotidis, P. (2022). “A digital storytelling mooc for foreign language learning with a focus on L2 speaking and writing,” in *Proceedings of EDULEARN22 conference 4th-6th July 2022*, Palma, 3402–3411.
- Martin-Monje, E., and Balcena, E. (eds) (2014). *Language MOOCs: Providing Learning. Transcending Boundaries*. Berlin: De Gruyter Open. doi: 10.2478/9783110420067
- May, T., and Perry, B. (2014). “Reflexivity and the practice of qualitative research,” in *The SAGE Handbook of Qualitative Data Analysis*, ed. U. Flik (Thousand Oaks, CA: SAGE), 109–122. doi: 10.4135/978144628243.n8
- Moore, R. L., and Wang, C. (2020). Influence of learner motivational dispositions on MOOC completion. *J. Comp. Higher Educ.* 33, 121–134. doi: 10.1007/s12528-020-09258-8
- Moradi, H., and Chen, H. (2019). Digital storytelling in language education. *Behav. Sci.* 9:147. doi: 10.3390/bs9120147
- Nair, V., and Yunus, M. M. (2021). A systematic review of digital storytelling in improving speaking skills. *Sustainability* 13:9829. doi: 10.3390/su13179829
- Nykvist, S. S., De Caro-Barek, V., Stockert, R., and Atle Lysne, D. (2021). Key factors needed for developing a higher education cross-campus learning environment in a nordic context. *Front. Educ.* 6:763761. doi: 10.3389/educ.2021.763761
- Palacios Hidalgo, F. J., Huertas Abril, C. A., and Gómez Parra, M. E. (2020). MOOCs: Origins, concept and didactic applications: A systematic review of the literature (2012–2019). *Technol. Knowl. Learn.* 25, 853–879.
- Parker, J., Maor, D., and Herrington, J. (2013). Authentic online learning: aligning learner needs, pedagogy and technology. *Issues Educ. Res.* 23, 227–241.
- Perifanou, M. (2016). “Worldwide state of language MOOCs,” in *Call communities and culture – Short papers from EUROCALL 2016*, eds S. Papadima-Sophocleous, L. Bradley, and S. Thouesny (Research-Publishing.Net), 386–390. doi: 10.14705/rpnet.2016.eurocall2016.593
- Perifanou, M., and Economides, A. (2014). “MOOCs for foreign language learning: an effort to explore and evaluate the first practices,” in *Proceedings of the INTED2014 Conference, 10th-12th March 2014*, (Valencia).
- Phan, T., Mcneil, S., and Ross Robin, B. (2016). Students’ patterns of engagement and course performance in a massive open online course. *Comp. Educ.* 95, 36–44. doi: 10.1016/j.compedu.2015.11.015
- Pray Lema, C. E. (2018). *Digital Storytelling as a Resource in the English Speaking Development*. Master thesis, Ecuador: Universidad Tecnica de Ambato.
- Postholm, M. B. (2019). “Chapter 7. analysing the data material using the constant comparative 785 analysis method and D-analysis,” in *Research and Development in School. Grounded in Cultural- 786 Historical Activity Theory*, (Leiden: Brill Academic Publishers), 85–102. doi: 10.1163/9789004410213\_007
- Ramírez-Fernández, M. B. (2015). La valoración de MOOC: una perspectiva de calidad. *RIED* 18, 171–195. doi: 10.5944/ried.18.2.13777
- Read, T., Sedano Cuevas, B., and Barcena, E. (2021). Inclusive language MOOCs. *JUCS-J. Universal Comp. Sci.* 27, 437–449. doi: 10.3897/jucs.67932
- Reich, J., and Ruipepérez-Valiente, J. A. (2019). The MOOC pivot. *Science* 363, 130–131. doi: 10.1126/science.aav7958
- Reichertz, J. (2019). “Abduction: the logic of discovery of grounded theory-an updated review,” in *The SAGE Handbook of Current Developments in Grounded Theory*, eds Bryant and Charmaz (Thousand Oaks, CA: SAGE Digital Edition). doi: 10.4135/9781526436061.n15
- Robin, B. (2006). “The educational uses of digital story telling,” in *Proceedings of the SITE 2006. Society for Information Technology and Teacher Education International Conference*, eds C. Crawford, R. Carlsen, K. McFerrin, J. Price, R. Weber, and D. Willis (Morgantown, WV: AACE - Association for the Advancement of Computing in Education), 709–716.
- Robin, B. R. (2008). Digital storytelling: a powerful technology tool for the 21st century classroom. *Theory Into Practice* 47, 220–228. doi: 10.1080/00405840802153916
- Roman, T. A., Callison, M., Myers, R. D., and Berry, A. H. (2020). Facilitating authentic learning experiences in distance education: embedding research-based practices into an online peer feedback tool. *TechTrends* 64, 591–605. doi: 10.1007/s11528-020-00496-2
- Rubino, I., Barberis, C., and Malnati, G. (2018). Exploring the values of writing collaboratively through a digital storytelling platform: a mixed-methods analysis of users’ participation, perspectives and practices. *Interact. Learn. Environ.* 26, 882–894. doi: 10.1080/10494820.2017.1419499
- Sallam, M. H., Martin-Monje, E., and Li, Y. (2022). Research trends in language MOOC studies: a systematic review of the published literature (2012–2018). *Comp. Assisted Lang. Learn.* 35, 764–791. doi: 10.1080/09588221.2020.1744668
- Sanchez-Gordon, S., and Luján-Mora, S. (2018). Research challenges in accessible MOOCs: A systematic literature review 2008–2016. *Universal Access Inf. Soc.* 17, 775–789.
- Shahid, M., and Khan, M. R. (2022). Use of digital storytelling in classrooms and beyond. *J. Educ. Technol. Systems* 51, 603–617. doi: 10.1177/00472395221112599

- Shen, C.-W., and Kuo, C.-J. (2015). Learning in massive open online courses: evidence from social media mining. *Comp. Hum. Behav.* 51, 568–577. doi: 10.1016/j.chb.2015.02.066
- Siemens, G. (2004). Connectivism: a learning theory for the digital age. *Int. J. Instruct. Technol. Distance Learn.* 2, 3–10.
- Siemens, G. (2005). Connectivism: A learning theory for the digital age. *Int. J. Instr. Technol. Distance Learn.* 2, 3–10.
- Siemens, G. (2007). “Connectivism: creating a learning ecology in distributed environments,” in *Didactics of Microlearning - Concepts, Discourses and Examples*, ed. T. Hug (Münster: Waxmann).
- Siemens, G., Rudolph, J., and Tan, S. (2020). As human beings, we cannot not learn. an interview with Professor George Siemens on connectivism, MOOCs and learning analytics. *J. Appl. Learn. Teach.* 3, 108–119. doi: 10.37074/jalt.2020.3.1.15
- StoryCenter *Listen deeply, tell stories*. Available online at: <https://www.storycenter.org/history>
- Stracke, C. M., and Trisolini, G. (2021). A systematic literature review on the quality of MOOCs. *Sustainability* 13:5817. doi: 10.3390/ijerph192114247
- Strauss, A., and Corbin, J. (1998). *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*, 2nd Edn. Thousand Oaks, CA: SAGE.
- Thornberg, R., and Charmaz, K. (2014). “Grounded theory and theoretical coding,” in *The SAGE Handbook of Qualitative Data Analysis*, ed. U. Flick (Thousand Oaks, CA: SAGE Digital Edition). doi: 10.4135/9781446282243.n11
- Walsh, I. (2014). A strategic path to study IT use through users’ IT culture and IT needs: a mixed method grounded theory. *J. Strategic Inform. Systems* 23, 146–173. doi: 10.1016/j.jsis.2013.06.001
- Walsh, I. (2015). Using quantitative data in mixed-design grounded theory studies: an enhanced path to formal grounded theory in information systems. *Eur. J. Inform. Systems* 24, 531–557. doi: 10.1057/ejis.2014.23
- Wotto, M. (2020). The future high education distance learning in canada, the united states, and france: Insights from before COVID-19 secondary data analysis. *J. Educ. Technol. Syst.* 49, 262–281.
- Wu, J., and Victor Chen, D.-T. (2019). A systematic review of educational digital storytelling. *Comp. Educ.* 147:103786. doi: 10.1016/j.compedu.2019.10.3786
- Yurkiw, S. (2017). *A Learning Theory to Connect with. OEFD Notes*. Winnipeg, MB: Rady Faculty of Health Sciences, University of Manitoba.
- Zhu, M., Bonk, C., and Sari, A. R. (2018). Instructor experiences designing MOOCs in higher education: pedagogical, resource, and logistical considerations and challenges. *Online Learn. J.* 22, 203–241. doi: 10.24059/olj.v22i4.1495