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ORIGINAL RESEARCH

The Learning Design of MOOC Discussion Forums: An Analysis of Forum Instructions and Their Role in Supporting the Social Construction of Knowledge

Dennis A. Rivera[1] · **Mariane Frenay**[1] · **Valérie Swaen**[2,3]

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Abstract
Social constructivism emphasises the role of meaningful interactions as a vehicle for learning. Meaningful interactions engage learners cognitively and socially with others to construct knowledge. Such interactions, however, require an environment specially designed to facilitate and guide learners' cognitive and social processes towards the construction of knowledge. Forums in massive open online courses (MOOCs) could potentially provide such an environment. However, research on how MOOC forums are designed to facilitate and guide cognitive and social processes is scarce. This study adopts a qualitative lens to examine the specifications, pedagogical instructions, and guidance provided in the forums of 4 edX MOOCs to help learners engage in meaningful interactions. We sought to uncover how MOOC forums are designed to support the social construction of knowledge. We found that MOOC forums mainly seek to facilitate cognitive processes while giving scant support or guidance to social processes. Such a learning design might favour the individual over the social construction of knowledge. To a certain extent, our findings help explain the questionable effectiveness of MOOC forums as social learning environments.

Keywords MOOC forums · Teaching presence · Pedagogical instructions

✉ Dennis A. Rivera
dennis.riveravilla@uclouvain.be

Mariane Frenay
mariane.frenay@uclouvain.be

Valérie Swaen
valerie.swaen@uclouvain.be

[1] Psychological Sciences Research Institute (IPSY), UCLouvain, Ottignies-Louvain-la-Neuve, Belgium

[2] Louvain Research Institute in Management and Organisations, UCLouvain, Ottignies-Louvain-la-Neuve, Belgium

[3] IESEG School of Management, CNRS, UMR 9221 - LEM - Lille Economie Management, Univ. Lille, Lille, France

1 Introduction

More than 10 years ago, massive open online courses (MOOCs) entered the higher education landscape to offer a non-formal learning experience. MOOCs are web-based courses developed by universities worldwide and provided on different educational platforms (e.g., Coursera, edX, FutureLearn, etc.). These courses allow hundreds of learners open access to high-quality education mostly without completion requirements. Given their massive, open, and online nature, MOOCs differ from other forms of online education such as blended courses or webinars; therefore, they arguably need a particular learning design (Kopp & Lackner, 2014; Sergis et al., 2017).

Learning design refers to the systematic and reflective process of planning methods of instruction and the situations in which such methods should be used to facilitate high-quality learning (Reigeluth & Carr-Chellman, 2009). A decade of research has shown that the learning design of MOOCs mainly reflects a teacher-centred approach; that is, it focuses on the transmission rather than the social construction of knowledge (e.g., Cha & So, 2020; Hew, 2018; Margaryan et al., 2015; Rodriguez, 2013; Watson et al., 2017). These studies used self-reported assessments and instruments based on instructional design principles to examine MOOC pedagogy and its quality; however, their focus lay on the overall course. The learning design of discussion forums has received considerably less attention.

This study analyses the learning design of MOOC forums through a qualitative lens. We shift the focus from instruments and self-reported assessments to the systematic analysis of the pedagogical instructions, specifications, and guidance given in MOOC forums to facilitate social learning. Thus, as delinated by Henri et al. (2007), we conduct research *with the forum as a learning environment* (p. 12); that is, research that seeks to better understand the learning design of MOOC forums. Our goal is to uncover the learning processes provided in the forums to facilitate meaningful interactions and help learners socially construct knowledge. This can shed light on the patterns of engagement that learners usually display, as well as help MOOC instructors optimise the learning design of forums.

2 Literature Review

2.1 The Social Construction of Knowledge in MOOC Forums

Leaning occurs in various ways; for instance, from repeated exposure to a stimulus, from observation, from critically reflecting upon information, and from social interactions (Bandura, 1977; Bryant et al., 2013; Ertmer & Newby, 2013; Piaget, 1985; Skinner, 1963; Vygotsky, 1978). These latter are crucial components in a learning experience because they help learners not only acquire new knowledge but co-construct it (Johnson & Johnson, 1987; Okita, 2012; Vygotsky, 1978). When interacting with others, learners engage cognitively and socially to explain and clarify concepts, answer questions, and negotiate meaning. These social and cognitive processes may contribute to restructure knowledge and enhance understanding (Garrison et al., 1999; Gunawardena et al., 1997). The benefits of social interactions for learning have been found to occur in the physical classroom as well as in online courses (e.g., Lu & Churchill, 2014; Webb, 1989). However, not all interactions contribute to learning. Woo and Reeves (2007) argue that, to facilitate learning, interactions among learners need to be meaningful.

Under a social constructivist perspective, meaningful interactions go beyond sharing opinions. They involve collaboration, critical reflection, and transactvity; that is, they are characterised by meaning negotiation, building on diverse ideas, and interlinking those ideas to reach a reflective consensus that improves knowledge (Hirumi, 2002; Vogel et al., 2016; Woo & Reeves, 2007). MOOC forums may facilitate such interactions (Crane & Comley, 2021). These forums provide learners with a venue to share, exchange, and confront different ideas. Discussing differing ideas with the goal to increase one's knowlegde (i.e., "mastery goals"; Ames, 1992, p. 261) can be beneficial to knowledge construction (Johnson & Johnson, 1999). However, previous research repeatedly reports that learner interactions in MOOC forums rarely occur. Moreover, the few interactions that occur do not usually involve exchanging or confronting ideas to construct knowledge (e.g., Galikyan et al., 2021; Onah et al., 2014; Tawfik et al., 2017). MOOC forum interactions are usually limited to course-related exchanges where learners ask and answer questions without exploiting the potential for social learning (Barman et al., 2019; Poquet et al., 2018).

Providing a venue to discuss varied perspectives is not enough to facilitate meaningful interactions (Guldberg & Pilkington, 2007; Johnson et al., 2008). Interactions might spark disputes or quick consensus, which differs from reflective consensus because it accepts contradictory arguments to avoid discord, instead of exploring different ideas (Asterhan, 2018). Disputes and quick consensus can be detrimental to learning (Buchs et al., 2008). Therefore, MOOC learners need guidance to engage in meaningful interactions. Guidance is particularly important in the context of MOOCs because the open nature of these courses grants learners a high degree of autonomy, which requires them to take responsibility for their learning (Brookfield, 2009). Without proper guidance, learners might not fulfil their learning responsibilites (Zhu et al., 2020). Because the massive nature of MOOCs impairs instructors from providing individual guidance, guidance needs to be embedded within the structure (i.e., the learning design) of the forums. This structure should help learners build a community where they can socially construct knowledge.

2.2 Teaching Presence

According to Garrison et al. (1999), a structure that helps learners build a community where they can interact and socially construct knowledge can be provided by a teaching presence. This presence involves designing, facilitating, and directing cognitive and social processes for the purpose of learning. Because it links learners' cognitive and social processes, the teaching presence is considered a critical factor in learners' academic success (Stavredes & Herder, 2013). A teaching presence, however, is not created by instructors alone. Both learners and instructors are responsible for building a teaching presence (Dockter, 2016; Garrison, 2021; Rovai, 2001). To build this presence, instructors design learning activities, facilitate interaction, and intervene in discussions to explain concepts or provide feedback (Shea et al., 2006). These activities lay the foundation for a teaching presence to emerge. Nevertheless, learners need to build upon this foundation by exploring concepts, identifying areas of agreement and disagreement, and developing a sense of community (Arbaugh et al., 2008; Koseoglu & Koutropoulos, 2016).

Yet, MOOC learners do not usually engage in activities aimed at building a teaching presence in forums. In addition, learners require a different set of skills online than in a physical classroom to build this presence (Verenikina et al., 2017). For example, besides technical skills to compose messages, learners also need cognitive skills to evaluate different arguments and the validity of external sources such as website links included in forum

posts (Card & Horton, 2000). In addition, learners need social skills to interact with others and interpret nonverbal cues that would be otherwise transmitted through direct dialogue (Tiene, 2000; Wang & Woo, 2007). As learners might not possess these skills, instructors need to design forums to facilitate their acquisition and/or development (Larson, 2000; Staquet, 2007). This implies employing teaching strategies (i.e., pedagogy) that engage learners with the content of the course (i.e., didactics) through the use of a technological tool (i.e., the forum).

Nevertheless, the incompatibilites between the technical characterisics of MOOC forums and the instructors' pedagogical or didactic choices could create instrumental conflicts (Marquet, 2011). These conflicts occur when the learning platform does not support instructors' pedagogical choices. Therefore, the learning design of MOOC forums requires instructors (or the pedagogical team) to harmonise the technical characterisics of the forum with the concepts to be learnt, so that learners can build a teaching presence (Conole, 2013; Koehler & Mishra, 2009). This begs the question of how MOOC instructors can design forums to help learners integrate different skills to build a teaching presence.

2.3 MOOC Forum Pedagogical Instructions and Forum Technical and Social Specifications (FTSSs)

To design MOOC forums, instructors can use forum technical and social specifications (FTSSs) and pedagogical instructions. FTSSs present technological affordances and netiquette guidelines. Technological affordances refer to the permissions and constraints of the learning platform (Hutchby, 2001). Lackner et al. (2014) suggest that informing learners about these affordances (e.g., how to compose and reply to messages or how to follow a discussion) is a crucial aspect of MOOC design. Netiquette guidelines serve as an ethical compass that informs learners about their expected social behaviour in the forums. These guidelines may reduce aggressive behaviour such as cyberbullying (Park et al., 2014). Thus, technological affordances and netiquette guidelines in FTSSs can potentially help MOOC learners acquire technical and social skills to engage in meaningful interactions. Nevertheless, FTSSs have been poorly researched and the skills they intend to facilitate are largely unknown.

Pedagogical instructions are directives that inform learners on how to perform a learning task (Ha & Wanphet, 2016). These instructions, either as questions, invitations, or requests, can help learners construct knowledge; however, their effectiveness depends on their clarity (Todd et al., 2008; Waring & Hruska, 2012). MOOC forum pedagogical instructions are fundamentally different from face-to-face classroom instructions, because they address all learners and cannot be instantly rephrased to improve clarity (Somuncu & Sert, 2019; St. John & Cromdal, 2016). To improve the clarity of MOOC forum pedagogical instructions, instructors might provide guidance. This guidance should aim at facilitating cognitive and social processes (Gagné et al., 1992). Therefore, MOOC forum pedagogical instructions and guidance can arguably support the social construction of knowledge.

3 Research Questions

Despite the important role that FTSSs and pedagogical instructions play in building a teaching presence, research analysing these two elements in MOOC forums is scarce. For example, Bali (2014) reports that MOOC instructors encourage learners to discuss course

concepts in the forums; however, she provides no description of the processes that instructors sought to facilitate. Similarly, Kasch and collegues (2021) report that MOOC forums include questions; yet, it is unclear whether those questions required a direct answer or served as guidance to facilitate learning. To date, the cognitive and social processes that MOOC learners are instructed to display in forums are to a large extent unknown. The guidance provided to help learners engage in meaningful interactions has not been identified either. This study seeks to fill this gap by empirically analysing the learning design of MOOC forums (operationalised through FTSSs and pedagogical instructions). Our goal is to better understand how forums are designed to help learners engage in meaningful interactions. This can shed some light on the quality and effectiveness of MOOC forums in facilitating the social construction of knowledge. Thus, our research questions and subquestions are:

RQ1 How are FTSSs designed to facilitate the use of technological affordances in forums and promote meaningful interactions?

Sub-Q1.1 What technical specifications do FTSSs provide regarding the technological affordances of the forums?

Sub-Q1.2 What social processes do FTSSs encourage or discourage through netiquette guidelines?

RQ2 How are MOOC discussion forums designed to facilitate the social construction of knowledge?

Sub-Q2.1 What learning processes do forum pedagogical instructions seek to facilitate?

Sub-Q2.2 What type of guidance do MOOC forums provide to promote meaningful interactions?

4 Methods

This study analyses FTSSs and MOOC forum pedagogical instructions through a qualitative lens (Denzin & Lincoln, 1994). This section describes the MOOCs analysed, the number of forums studied, and our data analysis procedure to examine FTSSs, pedagogical instructions, and guidance provided in the MOOCs.

4.1 Sample of MOOCs and Forums Analysed

This study involved four edX MOOCs (3 in English and 1 in French). The number of learners registered ranged from 877 to 4029 throughout all courses. We selected MOOCs in the area of humanities and social sciences that taught different essentially contested concepts (Gallie, 1956, cited in Collier et al., 2006). These concepts have diverse interpretations and involve conflicting definitions; therefore, they require that learners interact with one another to negotiate meaning and construct knowledge. The names of the MOOCs and the number of forums analysed can be seen in Table 1.

Table 1 MOOCs studied and their number of discussion forums

MOOCs	Name of the course	Total forums	Forums analysed	Other forums
MOOC 01	Communicating Corporate Social Responsibility (CSR)	45	42	3
MOOC 02	Psychologie de la négociation	14	12	2
MOOC 03	Oriental Beliefs—between reason and tradition	24	21	3
MOOC 04	Discover Political Science	23	19	4
	Total forums	106	94	12

4.2 Contextual Information of the Forums

The MOOCs were first created in 2015 and kept the same learning in every edition. That is, FTSSs and pedagogical instructions did not change from one edition to the next. We analysed the 2019 edition of the courses. All MOOCs were self-paced courses. A self-paced mode grants immediate access to all discussion forums as soon as the course starts. This differs from instructor-paced courses where forums are gradually made available to the learners. Thus, the MOOCs in this study arguably conceded a high degree of autonomy on the learners. Every forum in each MOOC addressed a specific topic. For instance, in MOOC 1, learners could discuss the meaning of CSR (in Forum 05), provide examples of good CSR communication (in Forum 20), or criticise CSR-washing practices (in Forum 29). Thus, the total number of forums also represents the topics available for discussion.

Forums were an integral part of all courses; yet forum discussion tasks were neither mandatory nor graded. Thus, learners could choose to engage in (or disengage from) any forum without affecting course completion grades. Nevertheless, learners were expected to engage in meaningful interactions because deep understanding of essentially contested concepts is best achieved though the exchange and confrontation of ideas. Learners' forum activity was periodically revised (every day in some MOOCs) either by the instructors or the pedagogical team. Forum posts from previous course editions were not available to the learners; however, in MOOC 01 for instance, instructors created a frequently asked questions (FAQ) section with previous inquires made in the forums. For the purpose of this study, we focused on the forums that sought to facilitate cognitive and/or social processes (n = 94). Other types of forums (e.g., forums to discuss technical or administrative issues) were excluded from our analysis, because they do not seek to engage learners in meaningful interactions.

4.3 Data Analysis Procedure

The analysis of FTSSs sought to identify the specifications provided to help learners acquire or develop technical and social skills in order to use the forums and engage in meaningful interactions. The analysis of forum pedagogical instructions focused on identifying learning processes and the guidance that sought to facilitate those processes. Specifications, learning processes, and guidance were analysed using a "hybrid approach" (Fereday & Muir-Cochrane, 2006, p. 80). This approach integrates an inductive and deductive analysis by generating codes from the data first and then deductively

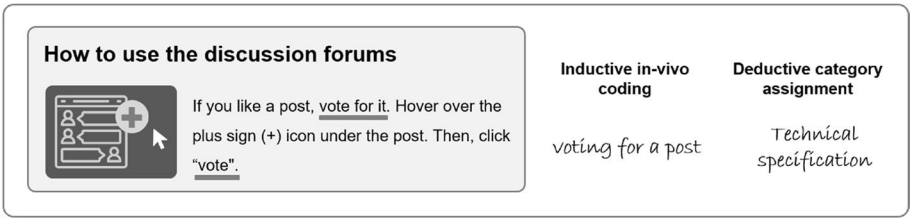

Fig. 1 Example of the hybrid coding approach

assigning them to theory-driven categories (e.g., technical, cognitive, or social). Figure 1 portrays an example of this hybrid-approach.

4.3.1 Identification and Analysis of FTSSs

To identify different specifications in FTSSs, we used the sentence as our unit of analysis because sentences can potentially express the ideas that instructors sought to convey. To identify sentences objectively and reliably, we followed the sentence syntactical structure defined by Gorsky et al. (2012). According to Panther and Köpcke (2008), some sentences need to be interpreted according to their context. Therefore, sentences such as *Then, click* "*vote*" (see Fig. 1) were interpreted together with the sentence(s) that preceded them.

As shown in Fig. 1, we employed "in vivo" coding (Strauss & Corbin, 1990, p. 69) for our inductive approach. In vivo coding takes words directly from the data to ensure that the coding mirrors the intended purpose of the MOOC instructors and, thus, reduces misinterpretation errors. Codes were then grouped into different theory-driven categories. As explained by Morse (2008), categories can be separated into sub-categories to better represent the data. The codes, categories, and sub-categories formed can be seen in Table 2. Examples of instructors' specifications can be found in Appendix 1.

4.3.2 Identification and Analysis of Learning Processes

Unlike FTSSs, MOOC forum pedagogical instructions are given in each forum. To identify the learning processes facilitated in the instructions, our unit of analysis was also the sentence. Sentences are expressed as assertions, commands, exclamations, or questions (Panther & Köpcke, 2008). As suggested by Downe-Wamboldt (1992), we coded sentences using both latent and manifest content analysis. This allowed to identify their literal and implied meaning. For instance, an instruction stating "Share your opinion about the concept of negotiation" literally invites learners to express their opinions; however, the question "For you, what does negotiation mean?" might facilitate the same cognitive process, but it does so implicitly.

Cognitive processes were operationalised through sentences inviting learners to display mental processes that help them construct knowledge (Krch, 2011). Social processes were operationalised through "statements not related to the formal content of the subject matter" (Henri, 1992, p. 126). As shown in Fig. 2, we identified not only

Table 2 Categories, sub-categories, and codes in FTSSs

Technical specifications		Social specifications		Other specifications	
Sub-categories	Codes	Sub-categories	Codes	Sub-categories	Codes
Navigating the platform	1. Using the Course Tab	Interacting with others	1. Responding to questions	Posts organisation	1. Using specific forums
	2. Seeing particular messages		2. Developing on ideas		2. Following own posts
			3. Letting others react		3. Flagging posts for moderation
Forum affordances	1. Adding a post	Politeness and diversity	1. Being polite	General specifications	1. Being concise
	2. Choosing the correct post type		2. Avoiding aggressions		2. Staying on topic
	3. Following other posts		3. Being aware of diversity		3. Checking for similar questions
	4.Receiving email notifications		4. Avoiding humour		4. Working off-line
	5. Seeing other learners' posts				5. Proof-reading posts
	6. Posting a response				6. Reading edX guidelines
	7. Voting for a post				

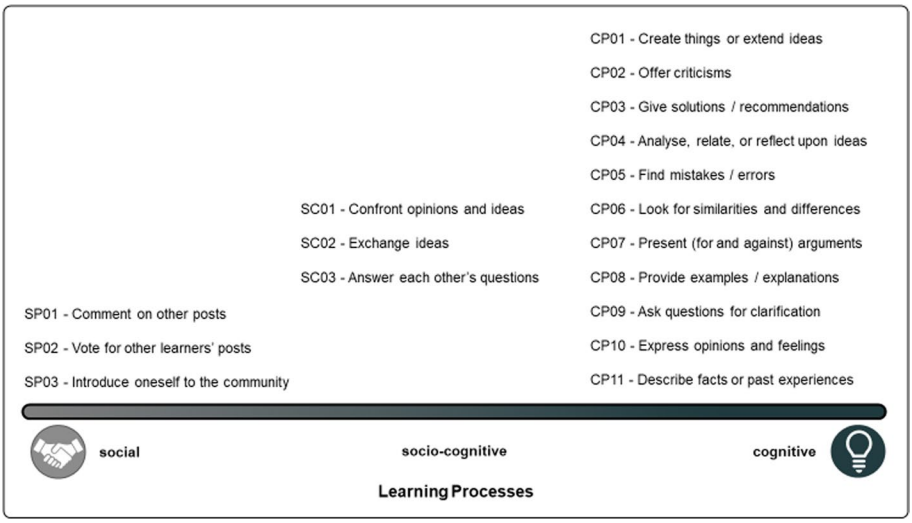

Fig. 2 Learning processes in forum pedagogical instructions

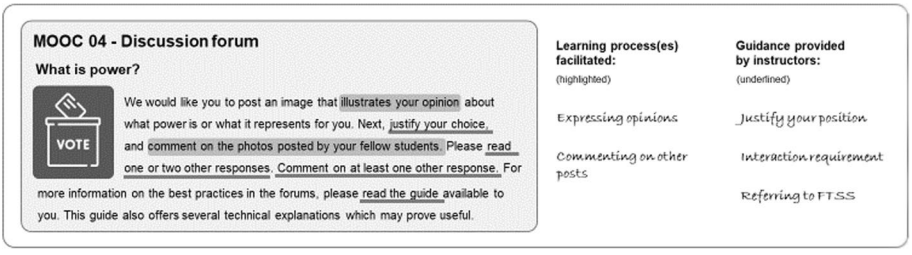

Fig. 3 Learning processes and guidance coded from a forum pedagogical instruction

cognitive and social but also processes that integrated a cognitive and a social component. For example, a pedagogical instruction asking learners to answer each other's questions (SC03) arguably involves both cognitive and social effort. Thus, we refer to these instructions as facilitating socio-cognitive processes.

Although several codes could sound similar, they differ in the type of engagement that they promote. For example, commenting on other posts (SP01) may sound similar to exchanging ideas (SC02). However, commenting on other posts arguably opens the possibility to any kind of comments, which include social comments (e.g., "thank you for your message"). Therefore, this process significantly differs from exchanging ideas because, through the exchange of ideas, learners can evaluate contradictory information and enrich their understanding of the course content; in other words, SC02 can potentially trigger meaningful interactions. An example of learning processes retrieved from a forum pedagogical instruction can be seen in Fig. 3. More detailed examples are provided in Appendix 2.

Table 3 Different types of guidance in MOOC forums

Type of guidance	Example of guidance	Learning processes
GD01—Supportive questions		
GD01A—Questions supporting social processes	What is your name? Where are you from?	Introduce oneself to the community
GD01B—Questions supporting cognitive processes	Answer the following questions: What creates your enthusiasm? What surprises you?	Analyse, relate, or reflect upon ideas
GD02—Connecting prior content	You may remember the description of Bidu from Unit 3.3 about Demons in Mesopotamia	Look for similarities and differences
GD03—Providing examples	Your smart checklist can be a list of bullet points in a.doc file; in a.xls file or under the format of a mind map, such as in the following example	–
GD04—Procedural guidance		
GD04A—Content expectations	Mention the most interesting or positive elements	Express opinions and feelings
GD04B—Requiring examples	Do you have any examples other than those cited in the videos?	Present (for and against) arguments
GD04C—Share material	Don't hesitate to share comments, photos, videos and articles on this topic	Describe facts or past experiences
GD04D—Learning path	Don't hesitate to create your own drawings or edit existing images	Create things or extend ideas
GD04E—Provide translations	If the poster is not in English, please provide a translation	–
GD04F—Justify a position	Please motivate your choice	Express opinions and feelings
GD04G—Academic integrity	Do not copy and paste text that already appears on Wikipedia	–
GD04H—Exhibit creativity	Be creative!	Create things or extend ideas
GD04I—Interaction requirements	Please read one or two other responses in the discussion	Comment on other posts
GD04J—Show respect	Develop respectful, meaningful interactions across our community	Confront opinions and ideas
GD05—Learning resources	For more information, read the following PDF describing the common delivery programme between Nestlé and PepsiCo	Analyse, relate, or reflect upon ideas
GD06—Technical guidance		
GD06A—Forum affordances	You can vote by clicking on the "+" button, on the right-hand side, next to the title of the post you like	Vote for other learners' posts
GD06B—Referring to FTSSs	Please read carefully the best practices regarding the forums	–

Some guidance did not intend to facilitate any learning process. This is shown by "–"

4.3.3 Identification and Analysis of Guidance

To analyse the guidance provided in the forums, we focused on the sentences that informed learners about the quality of the learning processes facilitated in the pedagogical instructions. These sentences answered the question *how*; that is, "how are learners asked to apply the required learning process in the forums?". Such sentences included, for instance, procedural guidance, questions, and learning resources. Procedural guidance informs learners about aspects such as the length of a post, content expectations,

Table 4 FTSSs given in different MOOCs

	MOOC 01	MOOC 02	MOOC 03	MOOC 04
Technical specifications				
Navigating the platform				
1. Using the Course Tab	X	X	X	X
2. Seeing particular messages	X	X	X	X
Forum affordances				
1. Adding a post	X		X	X
2. Choosing the correct post type	X	X	X	X
3. Following other posts	X	X	X	X
4. Receiving email notifications	X		X	X
5. Seeing other learners' posts	X	X	X	X
6. Posting a response		X		
7. Voting for a post	X	X	X	X
Social specifications				
Interacting with others				
1. Responding to questions		X		X
2. Developing on ideas				X
3. Letting others react				X
Politeness and diversity				
1. Being polite		X		X
2. Avoiding aggressions		X		X
3. Being aware of diversity				X
4. Avoiding humour				X
Other specifications				
General specifications				
1. Using specific forums			X	X
2. Following own posts			X	X
3. Flagging posts for moderation	X		X	X
Posting specifications				
1. Being concise		X		X
2. Staying on topic				X
3. Checking for similar questions	X	X		
4. Working off-line				X
5. Proof-reading your post				X
6. Reading edX guidelines	X		X	X

Table 5 Forums seeking to facilitate different types of learning processes

MOOCs	Forums facilitating different learning processes						Total forums
	Cognitive processes		Socio-cognitive and social Processes		Social Processes (SP03)		
	Total	%	Total	%	Total	%	
MOOC 1	34	80.95	7	16.67	1	2.38	42
MOOC 2	5	41.67	6	50.00	1	8.33	12
MOOC 3	19	90.48	1	4.76	1	4.76	21
MOOC 4	6	31.58	12	63.16	1	5.26	19
Total	64	68.08	26	27.66	4	4.26	94

or amount of interactive behaviour required. Questions may support cognitive, social, and socio-cognitive processes by helping learners structure their forum posts. Learning resources (e.g., pictures, videos, documents, external links, etc.) can provide additional information regarding the content of the course. Examples modelling the behaviour expected from the learners in the forums were also deemed to be guidance. An example of how guidance was identified in the forums can be seen in Fig. 3 and the different types of guidance coded are displayed in Table 3.

4.3.4 Reliability of the Analysis

The analysis of the FTSSs and MOOC forum pedagogical instructions was conducted manually. Two independent coders (one of the authors and an external researcher) coded the data using a fully-crossed design; that is, both coders coded all the data (Wirtz, 2020). We conducted an intraclass correlation coefficient (ICC) analysis in SPSS using a 2-way mixed-effects model with absolute agreement to determine inter-rater reliability. The average ICC was 0.98 with a 95% confidence interval from 0.97 to 0.99, which represents substantial agreement according to Landis and Koch (1977). Discrepancies between the coders were resolved through discussion and consensus.

5 Findings

To answer our research questions, we report our findings in 3 sub-sections. The first sub-section focuses on the technical and social specifications found in FTSSs. The second sub-section describes the learning processes found in pedagogical instructions. The last sub-section reports the guidance found in the instructions to support meaningful interactions.

5.1 Description of the Technical and Social Specifications Found in the FTSSs

As shown in Table 4, all courses provided the same technical specifications to navigate on the platform. Similarly, most MOOCs gave the same specifications regarding the

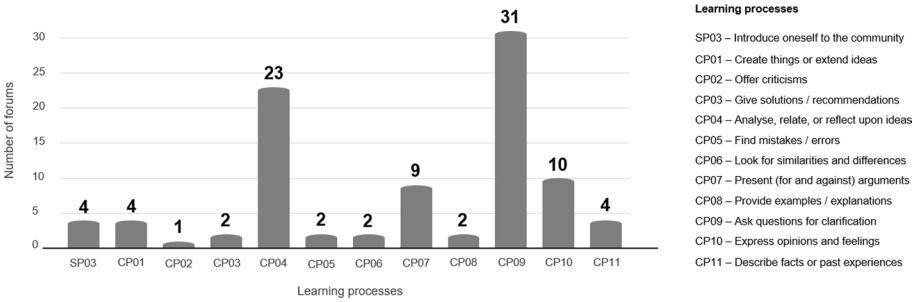

Fig. 4 Learning processes facilitated in MOOC forum instructions

technological affordances of the forums. MOOC 02, however, did not inform learners about how to post a message or how to receive email notifications of forum activity. Nevertheless, this MOOC was the only course to inform how to reply to a previous post.

Several differences were found in the social specifications provided. First, not all courses gave thorough guidance for interactions. As shown in Table 4, some MOOCs did not give any social specifications. Second, even when some MOOCs gave the same guidance, it was explained differently. For instance, two MOOCs instructed learners to avoid aggressive behaviour. However, in one MOOC, aggressive behaviour was explained as "insulting or demeaning behaviour" whereas in another MOOC it meant writing in capital letters because they are "equivalent to shouting". Although social specifications encouraged learners to respond to questions posted by other learners, they did not provide specific examples of how to acknowledge peer contributions or politely refute counterarguments.

Table 6 Distribution of social and socio-cognitive processes in forums facilitating specific cognitive processes

Cognitive processes (CP)	Social processes (SP)			Socio-cognitive processes (SC)			Total[1]
	SP01	SP02	SP03	SC01	SC02	SC03	
CP01—Create things or extend ideas	1				1		2
CP02—Offer criticisms	1						1
CP03—Give solutions / recommendations							0
CP04—Analyse, relate, or reflect upon ideas	1			1	1		3
CP05—Find mistakes / errors					1		1
CP06—Look for similarities and differences							0
CP07—Present (for and against) arguments		1			2	1	4
CP08—Provide examples / exlanations					2		2
CP09—Ask questions for clarification				5	4		9
CP10—Express opinions and feelings	2			1	1	1	4
CP11—Describe facts or past experiences							0
Total[2]	5	1	0	2	12	6	26

Social Processes (SP): SP01—Comment on other posts, SP02—Vote for other learners' posts, SP03—Introduce oneself to the community. Socio-cognitive processes (SC): SC01—Confront opinions and ideas, SC02—Exchange ideas, SC03—Answer each other's questions. Totals: Total[1]—Total forums facilitating SP or SC in forums facilitating CP, Total[2]—Total times a forum included a SP or a SC

All courses gave general and specific posting specifications. Here again, MOOCs differed in the guidance they gave to help learners use the forums. Although most MOOCs advised learners to flag posts to be reviewed by a moderator, they did not specify what type of messages could or should be reported. MOOCs also differed on what being concise meant. While in one MOOC learners were instructed to "avoid long messages because they are difficult to read online", in another one, learners were explicitly encouraged to "keep posts to a maximum of 200 words".

5.2 Description of Learning Processes in Forum Pedagogical Instructions

From the forums analysed ($N=94$), 64 forums (68.08%) sought to facilitate only cognitive processes. These forums invited learners to express their opinions (CP10) or analyse the content of the course (CP04), but they did not explicitly encourage any social or socio-cognitive process. All socio-cognitive process and most social processes occurred in 27.66% of the forums (26 forums). These processes were facilitated together with a cognitive process. The only social process encouraged in isolation; that is, without any cognitive processes was inviting learners to introduce themselves (SP03). The distribution of different learning processes per MOOC can be seen in Table 5.

The cognitive process encouraged the most was asking questions (cf. Figure 4). In total, 31 out of 94 forums encouraged learners to ask questions for clarification (CP09). This cognitive process offered learners the opportunity to reflect upon their learning and demand further explanations or clarification of the content. Other cognitive processes frequently encouraged were analysing several aspects of the content of the course (CP04—23 forums), expressing opinions (CP10—10 forums), and asking questions for clarification (CP07—9 forums). Forums inviting learners to give solutions or recommendations (CP03), look for similarities and differences (CP06), and create things or extend ideas (CP01) were scarce.

As shown in Table 5 and Fig. 4, inviting learners to introduce themselves (SP03) only occurred in 4 forums (one forum per MOOC). This process presumably aimed at helping learners build a sense of community. SP03 was the only social process that occurred in isolation. Other social and socio-cognitive processes such as inviting learners to comment on other posts (SP01), vote for other learners' posts (SP02), or exchange ideas (SC02) were never encouraged alone, but occured together with a cognitive process. For instance, 4 of the forums instructing learners to ask questions for clarification (CP09) also invited them

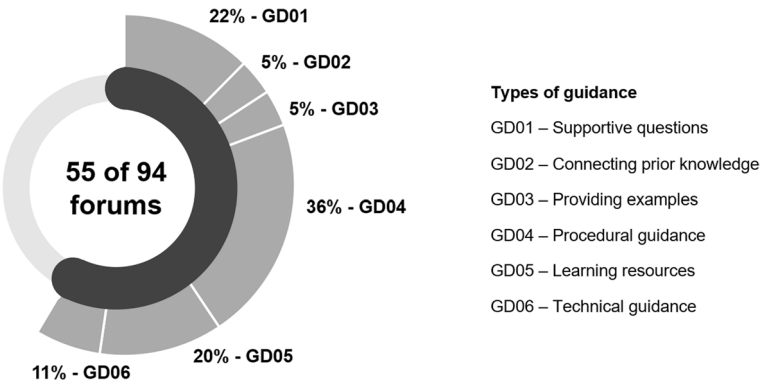

Fig. 5 Guidance provided in MOOC discussion forums

Table 7 Distribution of the nuances in types of guidance in the discussion forums

Learning processes		Total forums	Forums providing guidance	Types of guidance provided in the forums			
				GD01		GD02	GD03
				GD01A	GD01B		
SP03	Introduce oneself to the community	4	4	4			
CP01	Create things or extend ideas	2	2		1	1	1
CP01 + SP01	+ comment on other posts	1	1			1	
CP01 + SC02	+ exchange ideas	1	1				1
CP02 + SP01	Offer criticisms + comment on other posts	1	1				
CP03	Give solutions/recommendations	2	2			1	
CP04	Analyse, relate, or reflect upon ideas	20	19		11		2
CP04 + SP01	+ comment on other posts	1	1				
CP04 + SC02	+ exchange ideas	1	0				1
CP04 + SC03	+ answer each other's questions	1	1		1		
CP05	Find mistakes/errors	1	1				
CP05 + SC02	+ exchange ideas	1	1				
CP06	Look for similarities and differences	2	2			1	
CP07	Present (for and against) arguments	5	4			1	
CP07 + SP02	+ vote for other learners' posts	1	1				
CP07 + SC01	+ confront opinions and ideas	1	0				
CP07 + SC02	+ exchange ideas	2	0				
CP08 + SC02	Provide examples/explanations + exchange ideas	2	2				1
CP09	Ask questions for clarification	22	0				
CP09 + SC02	+ exchange ideas	4	4				
CP09 + SC03	+ answer each other's questions	5	0				
CP10	Express opinions and feelings	6	3				
CP10 + SP01	+ comment on other posts	2	2				
CP10 + SC01	+ confront opinions and ideas	1	0				
CP10 + SC02	+ exchange ideas	1	0				

Table 7 (continued)

Learning processes		Total forums	Forums providing guidance	Types of guidance provided in the forums			
				GD01		GD02	GD03
				GD01A	GD01B		
CP11	Describe facts or past experiences	4	3		2		
Total[1]		94	55				
Total[2]				4	15	5	6

Learning processes		Types of guidance provided in the forums												
		GD04										GD05	GD06	
		GD04A	GD04B	GD04C	GD04D	GD04E	GD04F	GD04G	GD04H	GD04I	GD04J		GD06A	GD06B
SP03	Introduce oneself to the community													
CP01	Create things or extend ideas	1			1									
CP01 + SP01	+ comment on other posts	1							1					
CP01 + SC02	+ exchange ideas				1									
CP02 + SP01	Offer criticisms + comment on other posts						1	1	1		1			
CP03	Give solutions/recommendations	1							1					
CP04	Analyse, relate, or reflect upon ideas	3		5	1							9		2
CP04 + SP01	+ comment on other posts									1				
CP04 + SC02	+ exchange ideas	1										1		
CP04 + SC03	+ answer each other's questions			1		1							1	

Table 7 (continued)

Learning processes		Types of guidance provided in the forums												
		GD04										GD05	GD06	
		GD04A	GD04B	GD04C	GD04D	GD04E	GD04F	GD04G	GD04H	GD04I	GD04J		GD06A	GD06B
CP05	Find mistakes/errors											1		
CP05+SC02	+exchange ideas			1										
CP06	Look for similarities and differences				1							2		
CP07	Present (for and against) arguments	1	2	1			1					2		
CP07+SP02	+vote for other learners' posts				1									
CP07+SC01	+confront opinions and ideas													
CP07+SC02	+exchange ideas													
CP08+SC02	Provide examples/explanations+exchange ideas	1												
CP09	Ask questions for clarification													
CP09+SC02	+exchange ideas												4	4
CP09+SC03	+answer each other's questions													
CP10	Express opinions and feelings	1	1									1		
CP10+SP01	+comment on other posts			2			2			1				2
CP10+SC01	+confront opinions and ideas													
CP10+SC02	+exchange ideas													

Table 7 (continued)

Learning processes		Types of guidance provided in the forums												
		GD04										GD05	GD06	
		GD04A	GD04B	GD04C	GD04D	GD04E	GD04F	GD04G	GD04H	GD04I	GD04J		GD06A	GD06B
CP11	Describe facts or past experiences			2										
Total[1]														
Total[2]		10	3	12	5	1	4	1	3	2	1	17	5	8

GD01—Supportive questions: GD01A—Questions supporting social processes, GD01B—Questions supporting cognitive processes. GD02—Connecting prior content. GD03—Providing examples. GD04—Procedural guidance: GD04A—Content expectations, GD04B—Requiring examples, GD04C—Share material, GD04D—Learning path, GD04E—Provide translations, GD04F—Justify a position, GD04G—Academic integrity, GD04H—Exhibit creativity, GD04I—Interaction requirements, GD04J—Show respect. GD05—Learning resources. GD06—Technical guidance: GD06A—Forum affordances, GD06B—Refer to FTSSs. Total[1]—Total forums. Total[2]—Frequencies of types of guidance

to exchange ideas with other learners (SC02). The distribution of social and socio-cognitive processes within different cognitive process can be seen in Table 6.

As shown in Table 6, inviting learners to comment on the messages posted by their peers (SP01) was often facilitated together with a cognitive process. This process was encouraged in forums asking learners to express their opinions (CP10), offer criticisms (CP02), analyse and reflect upon ideas (CP04), and create new things or extend ideas (CP01). Because commenting involves reading forum messages in the first place, this instruction could potentially expose learners to differing perspectives that could trigger meaningful interactions. The socio-cognitive process facilitated the most was inviting learners to exchange ideas (SC02). Exchanging ideas was mostly encouraged in forums that required learners to ask questions (CP09); hence, these forums could also potentially facilitate meaningful interactions.

Given that social and socio-cognitive processes (other than SP03) were encouraged together with a cognitive process, we make a distinction between forums that sought to facilitate only cognitive processes and forums that, besides cognitive processes, also encouraged a social or a socio-cognitive process. For example, the 4 forums encouraging learners to describe facts or past experiences (CP11) did not encourage any other social or socio-cognitive processes (cf. Table 6). Conversely, the only forum inviting learners to offer criticisms (CP02) also invited learners to comment on other posts (SP01); thus, this forum was coded as CP02 + SP01. Similarly, out of the 31 forums encouraging learners to ask questions (CP09) (cf. Figure 4), 5 invited them to confront opinions and ideas (SC01) and 4 forums encouraged the exchange of ideas (SC02). Thus, those 31 forums were in total 22 CP09 forums, 5 CP09 + SC01 forums, and 4 CP09 + SC02 forums. This distinction is considered when analysing the guidance provided in the forums.

5.3 Description of the Guidance Found in Forum Pedagogical Instructions

In total, 58.51% of forums (55 out of 94 forums) provided guidance. Procedural (GD04—36%), supportive questions (GD01—22%), and learning resources (GD05—20%) were provided more frequently than other types of guidance. Figure 5 displays the distribution between various types of guidance provided.

The analysis of the nuances in the types of guidance provided in the forums can be seen in Table 7. The most common procedural guidance provided was inviting learners to share learning material such as photos, videos and articles (GD04C). Questions supporting social processes (GD01A) only occurred in forums inviting learners to introduce themselves (SP03). Questions supporting social processes (GD01B) occurred in forums seeking to facilitate cognitive and socio-cognitive processes such as describing facts and past experiences (CP11) or analysing ideas and answering each other's questions (CP04-SC03). Both GD01A and GD01B sought to help learners structure their messages by including important aspect of the course content. Some forums provided one specific type of guidance whereas others provided several types. For example, the 4 forums inviting learners to ask questions and exchange ideas (CP09-SC02) included solely technical guidance (GD06). However, forums encouraging learners to analyse, relate, or reflect upon ideas (CP04) or to create things and extend ideas (CP01) included different types of guidance.

As shown in Table 7, only two forums provided guidance regarding interactions (GD04I) and one forum invited learners to develop respectful interactions (GD04J). Guidance modelling on how learners should re-state, challenge, or justify their opinions was not provided. Although most MOOC forums encouraged learners to ask questions for clarification ($n = 31$), only four provided guidance. This guidance was mostly technical and informed learners about the technological affordances of the forums. The implications of these findings are discussed in the next section.

6 Discussion

This paper analysed MOOC forums to study how their learning design may support the social construction of knowledge. We examined the specifications, learning processes, and guidance that instructors gave to facilitate meaningful interactions. Concerning our first research question, we found that FTSSs informed learners about the technological affordances of the forums, but did not always provide social guidance. Due to their diverse backgrounds, MOOC learners' interpersonal skills can vary considerably. Thus, learners need explicit guidance to engage in meaningful interactions (DeBoer et al., 2013; Kim & Bonk, 2002); however, such guidance was not frequently provided. Although FTSSs asked learners to be polite and helpful, they also asked them to refrain from posting long messages, which could refrain learners from elaborating on their perspectives. Without elaborating on their views, learners might not be able to explore differing perspectives thoroughly or reach a reflective consensus. This type of guidance could thus impair meaningful interactions. Based on these results, it is important for future research to question what the educational purpose of FTSSs is and how their learning design may support the social construction of knowledge. This could enlighten the learning design of MOOC forums.

Regarding our second research question, we found that social and socio-cognitive processes were scarcely supported. Overall, 27.66% of the forums invited learners to interact with one another, but only a few forums provided guidance for interactions. These findings are consistent with Witthaus' (2018) analysis, which showed that social processes are not sufficiently fostered in MOOCs. Nevertheless, we noticed important differences depending on the course. Some MOOCs fostered more socio-cognitive processes than only cognitive processes. Thus, another critical question is what drove the learning design of the forums in these courses. All MOOCs in this study taught essentially contested concepts. However, teaching and learning these concepts may require different approaches depending on the intended learning outcomes of the forums or the learning design preferences of MOOC instructors. Thus, future research could investigate the optimal learning design conditions for MOOCs teaching essentially contested concepts.

A considerable number of forums invited learners to express opinions. However, such forums did not encourage exploring different perspectives, evaluating their validity, or reaching a reflective consensus. Thus, these forums arguably might not provide a venue for meaningful interactions. Similarly, several forums invited learners to ask questions. According to Deng and Benckendorff (2021), MOOC learners consider forums for asking questions important for their learning. However, we found that only few forums (9 out of 31) encouraged learners to exchange and confront ideas, and even fewer forums provided

guidance. More interestingly, the guidance provided was only technical and aimed to help learners use the forum affordances. Guidance on how to address their peers' questions and engage in meaningful interaction, which is essential to help learners build a teaching presence, was completely missing.

Based on our results, we infer that MOOC forums might engage learners in the individual rather than the social construction of knowledge. This is consistent with the analysis of Kasch et al. (2021), who found that MOOC forums encourage reflective behaviour, but do not provide guidance for interactions. Such a learning design might not favour building a teaching presence. This presence responds to a socio-constructivist approach to teaching and learning (Arbaugh et al., 2008; Hein, 1991). However, instructors seem to adopt a more classical approach when designing MOOCs (Margaryan et al., 2015; Rodriguez, 2013). This approach is focused on the instructor and usually favours the transmission over the social construction of knowledge. Learners also seem to prefer this approach, since they see instructors as "a primary source of knowledge" (p. 20) and expect instructors to answer their questions in discussion forums (Deng & Benckendorff, 2021). Therefore, if the purpose of MOOC forums is to provide a learning environment for the social construction of knowledge, more attention needs to be paid to the learning design in order to better lay the foundation for a teaching presence to emerge.

7 Limitations

Our study can be perceived as telling only half the story without the analysis of learner forum activity in response to the learning design of FTSSs, forum pedagoical instructions, and guidance. However, previous research on MOOC discussion forums repeatedly shows that learner interactions in are scarce and limited to surface levels of cognitive engagement; that is, sharing and comparing information without negotiating meaning or constructing knowledge (e.g., Barman et al., 2019; Galikyan et al., 2021; Poquet et al., 2018; Tawfik et al., 2017). We argue that the low cognitive engagement and poor learner interactions in MOOC forums can be partially explained by the learning design of the forums. At the same time, we acknowledge that other learner-related factors, such as motivation and cultural background can also influence their engagement in MOOC forums (De Vries et al., 2014; Fang et al., 2019).

This study sheds some light on the learning processes that instructors sought to facilitate in MOOC forums to support the social construction of knowledge. However, we did not study the level of complexity of these processes. According to several learning taxonomies, cognitive processes such as describing facts or past experiences and sharing opinions require less cognitive effort than analysing concepts or offering criticisms (e.g. Biggs & Collis, 1982; Bloom, 1956; Gagné et al., 1992). Similarly, answering each other's questions or confronting different ideas requires higher inter-personal involvement than expressing mere agreement or disagreement, or thanking someone for their contributions. Future research could look into the quality of the cognitive and social processes required from MOOC learners and analyse the extent to which different processes help them socially construct knowledge.

In addition, this study focused on the pedagogical instructions and guidance provided in MOOC discussion forums. Guidance on how to explore new concepts, identify areas of agreement and disagreement, and develop a sense of community was not found. Such

guidance could have been provided by instructors directly commenting on learners' forum posts. Nevertheless, the analysis of learner–instructor interactions in the forums was beyond the scope of this research. Instructors' direct intervention in a forum discussion does not seem to contribute significantly to the cognitive engagement of learners (Wang & Stein, 2021; Zhao & Sullivan, 2017).

The findings in our study suggest that MOOC instructors design discussion forums to engage learners mostly cognitively, relegating social processes to a secondary role. Nonetheless, the self-paced mode of the course or the extent to which the edX platform allows instructors to minimise instrumental conflicts may also play a role in how learners can build a teaching presence. Without proper pacing guidance (e.g., a suggested schedule), learners might fall prey to procrastination (Yao et al., 2020). In addition, this course delivery mode enables learners to complete the course at different rates, which makes learner interactions more challenging (Rhode, 2009). Similarly, the technological affordances of the forums can be a determinant factor in the forums' sociability, that is, the social space that MOOC instructors are able to provide to learners (Kasch et al., 2021; Kreijns et al., 2002). Future research should thus focus on understanding the gap between the learning design that MOOC instructors would like to implement and the design that they are able (or restricted) to implement in discussion forums.

Lastly, although the number of forums examined was not small, the number of courses was. We analysed 4 MOOCs in the area of humanities and social sciences. These courses were selected because they could engage learners in meaningful interactions. Concepts such as corporate social responsibility (CSR) or what negotiation means could trigger the exploration of differing perspectives, because their meaning can vary according to the learners' cultural background (among other factors). However, it is difficult to draw general conclusions from a small sample. Furthermore, other concepts that might not be essentially contested could also trigger meaningful interactions. Future studies should thus broaden the scope of analysis and investigate whether other courses include forums that seek to facilitate similar (or different) learning processes to the ones found in this study.

8 Conclusion

After a decade of research on MOOCs, this paper offers a new perspective by shifting the focus from the analysis of the overall course to the systematic analysis of the pedagogical instructions and guidance provided in the forums. We identified the specific social, cognitive, and socio-cognitive processes facilitated to help learners engage in discussions. Due to the lack of proper guidance for meaningful interaction, the learning design of the MOOC discussion forums analysed in this study might not provide an environment where learners can socially construct knowledge. We believe that this new perspective contributes to a better understanding of how discussion forums might allow a teaching presence to flourish in an online learning environment. Our findings align with previous research showing that MOOC instructors give scanty attention to social processes. However, more research is necessary to determine what supports or limits the learning experience that MOOC instructors are able to offer in this complex online learning environment.

Appendix 1

Categories, sub-categories, and codes in FTSSs

Sub-categories	Codes	Specification given from instructors
Category: technical specifications		
Navigating the platform	1. Using the Course Tab	We invite you to post your messages from the Course tab rather than from the Discussion tab
	2. Seeing particular messages	If you only want to see messages related to a particular discussion thread, click on "All Topics"
Forum affordances	1. Adding a post	To take part to a specific discussion, click on "Add a post" and you will directly access the discussion thread
	2. Choosing the correct post type	Make sure you chose the correct post type (either a question or a discussion)
	3. Following other posts	If you find a post particularly interesting and want to return to it in the future, click on the "follow" button (the star icon)
	4. Receiving email notifications	If you'd like to receive notification emails about updates on the messages you are following, click on the ad hoc button
	5. Seeing other learners' posts	To see previous messages from other students, click on Show Discussion
	6. Posting a response	Si vous répondez à un message de quelqu'un d'autre, utilisez la fonctionnalité "Poster une réponse" en dessous de son message. *(transl.) If you reply another learner's message, click on the "post a response" button below
	7. Voting for a post	If you like a post, vote for it
Category: social specifications		
Interacting with others	1. Responding to questions	Répondez aux questions des autres, si vous connaissez la réponse. *(transl.) Respond to questions raised by others if you know the answer
	2. Developing on ideas	To add value to the discussion, take the time to read the opinions already expressed and try to develop these good ideas even further
	3. Letting others react	You can always add a follow-up post, but give others the opportunity to react
Politeness and diversity	1. Being polite	Be civil and polite
	2. Avoiding aggressions	Insulting, demeaning, or aggressive behaviour will not be tolerated
	3. Being aware of diversity	Remember you have a broad, multicultural audience; so, don't presume that your readers share your background
	4. Avoiding humour	Don't forget that humour and irony do not translate easily; that is, your readers might take offense at expressions that seem quite innocuous to you
Other specifications		
General specifications	Using specific forums	Please note that there is a specific page from which you can send your technical, administrative and general questions
	Following own posts	It's a good idea to follow your own posts so that you can easily find them again in the future and see the answers to them
	Flagging posts for moderation	You can flag any post, response, or comment for a discussion moderator to review

Sub-categories	Codes	Specification given from instructors
Posting specifications	Being concise	Évitez les longs messages, difficiles à lire en ligne. *(transl.) Avoid long messages because they are difficult to read online
	Staying on topic	Stay on topic, and avoid being distracted by secondary issues or off-topic remarks
	Checking for similar questions	Before asking a question, check if someone else has already raised the same issue!
	Working off-line	Work on your text offline, and then copy and paste them into the forum to prevent you from accidentally losing your text due to technical difficulties
	Proof-reading your post	The majority of learners are not native English speakers, but even for those who are, it is always useful to proof-read posts before submitting them
	Reading edX guidelines	If you have any doubts, you can always check the edX Guide for Students

*(transl.) provides an English translation from specification given in French

Appendix 2

Learning processes facilitated in MOOC forum pedagogical instructions

Code		MOOC forum pedagogical instruction
Social processes		
SP01	Comment on other posts	Comment on at least one other response
SP02	Vote for other learners' posts	Vote for what you feel are the best proposals
SP03	Introduce oneself to the community	Please present yourself in the following thread of discussion
Socio-cognitive processes		
SC01	Confront opinions and ideas	N'hésitez pas à interagir avec les autres apprenant(e)s à ce propos et à confronter vos différents points de vue ! *(transl.) Feel free to interact with other learners and confront your different points of view!
SC02	Exchange ideas with other learners	We strongly encourage you to exchange your ideas and opinions with the community of your co-participants
SC03	Answer each other questions	J'invite tous/toutes les participant(e)s du MOOC à s'aider mutuellement et à tenter de répondre aux questions posées par les autres apprenant(e)s. *(transl.) I invite all MOOC participants to help each other and try to answer the questions asked by other learners
Cognitive processes		
CP01	Create things or extend ideas	Create your own representation of the Netherworld
CP02	Offer criticism	It's time for you to share with our community the main criticisms you would formulate against the CSR concept

Code		MOOC forum pedagogical instruction
CP03	Propose solutions or make recommendations	In this context, what recommendations can you offer for companies that make genuine CSR efforts when it comes to communicating about CSR while also trying to avoid accusations of CSR-washing?
CP04	Analyse, relate, or reflect upon ideas	After reading those different extracts from Machiavelli's The Prince, would you say that "the end justifies the means"?
CP05	Find mistakes / errors	Can you find the calculation error? In this unit we look at an allegory designed by the Ikhwun al-uafu. The allegory is nice, but is based on incorrect calculations!
CP06	Look for similarities and differences	We invite you to look for similar features in the work of Pieter Huys (1547), Max Ernst (1945) or in any other painting you find depicting such traits
CP07	Present (for and against) arguments	Please explain your answer in the discussion forum, such that you help build a list of arguments for and against CSR communication
CP08	Provide examples or further explanations	Could you give a concrete example of a good CSR communication?
CP09	Ask questions for clarification	Do you have comments or questions about those videos? Please share them in the discussion thread below
CP10	Express opinions and feelings	What are your thoughts and feelings about the Nestlé company?
CP11	Describe facts or past experiences	In your own culture, are there any divinities linked to natural elements? Which ones, and what do they represent?

*(transl.) provides an English translation from specification given in French

Appendix 3

Different types of guidance provided in MOOC forums

Type of guidance	Definition of the guidance	MOOC forum pedagogical instruction	
		Example of guidance provided	Context of the guidance
GD01—Supportive questions			
GD01A—Questions to support social processes	Questions helping learners structure their social answers	What is your name? Where are you from? Why did you register?	Please present yourself in the following thread of discussion
GD01B—Questions to support cognitive processes	Questions helping learners structure their cognitive answers	Answer the following questions: What creates your enthusiasm? What surprises you? What creates your scepticism?	Choose the project that you find the most interesting and contribute your insights to the discussion forum

Type of guidance	Definition of the guidance	MOOC forum pedagogical instruction	
		Example of guidance provided	Context of the guidance
GD02—Connecting prior content	Sentences mentioning previously studied content	You may remember the description of Bidu from Unit 3.3 about Demons in Mesopotamia	Look for similar features in the work of Pieter Huys (1547) or Max Ernst (1945) and share your discoveries with the community in the forum below!
GD03—Providing examples	Examples given by the MOOC instructors	Your smart checklist can be a list of bullet points in a.doc file; in a.xls file or under the format of a mind map, such as in the following example	You should engage in designing a smart checklist. We encourage you to exchange ideas and opinions with the community of your co-participants, using the dedicated discussion forum
GD04—Procedural guidance			
GD04A—Content expectations	Sentences indicating what to include in the message	Mention the most interesting or positive elements	Let's discuss your thoughts and feelings about this report
GD04B—Requiring examples	Sentences requiring learners to give examples	Do you have any examples other than those cited in the videos?	Please share your thoughts about why Pazuzu is still popular nowadays
GD04C—Share material	Sentences inviting learners to share images, links, etc	Don't hesitate to share comments, photos, videos and articles on this topic	In your own culture, are there any divinities linked to natural elements?
GD04D—Learning path	Sentences providing options for engaging in the forum	Don't hesitate to create your own drawings or edit existing images	Create your own representation of the Netherworld
GD04E—Provide translations	Sentences requiring translations	If the poster is not in English, please provide a translation	To what extent does an election poster reflect an ideology? Post an electoral poster of your choice
GD04F—Justify a position	Sentences asking learners to justify, support, or explain a position	Please motivate your choice	In your opinion, what is the state? Post a photo illustrating what a state is, in your opinion
GD04G—Academic integrity	Sentences emphasizing academic integrity	Do not copy and paste text that already appears on Wikipedia	Share with our community the main criticisms you would formulate against this concept
GD04H—Exhibit creativity	Sentences encouraging creativity	Be creative!	Post other possible solutions to this exercise in the forums
GD04I—Interaction requirements	Sentences informing learners about the amount of interaction expected	Please read one or two other responses in the discussion. Comment on at least one other response	What is power? We would like you to post a photo in the forum that illustrates what power is or what represents it for you

Type of guidance	Definition of the guidance	MOOC forum pedagogical instruction	
		Example of guidance provided	Context of the guidance
GD04J—Show respect	Sentences emphasizing good social behaviour	Develop respectful, meaningful interactions across our community	Share with our community the main criticisms you would formulate against this concept
GD05—Learning resources	Sentences informing learners about available information or documents	For more information, read the following PDF	Contribute with your insights (about this project) in the discussion forum
GD06—Technical guidance			
GD06A—Forum affordances	Sentences referring to the affordances of the forums	You can vote by clicking on the "+" button, on the right-hand side, next to the title of the post you like	Find another example of a miracle that you think could be suitable for a cross-analysis
GD06B—Referring to FTSSs	Sentences asking learners to read the FTSSs	For more information on the best practices in the forums, please become familiar with the guide made available to you	What is power? We would like you to post a photo in the forum that illustrates what power is or what represents it for you

Author contribution Conceptualization, methodology, investigation, and writing – original draft: DR Supervision, conceptualization, and writing – review and editing: MFSupervision, methodology, and writing – review and editing: VS.These author contributions are based on the CRediT taxonomy.

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Declarations

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