

## **Fostering digital skills and competencies through discursive mapping of information landscapes**

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### **Abstract**

*The digitisation of society produces a need to foster new skills and competences in learners. Graduates will move into positions in industry and civic life in which they are expected to make informed judgments using a wide range of information sources and tools for finding, organising and communicating this information, individually and collaboratively. These tools and sources are organised around the learner in what Lloyd (2010) calls an “information landscape”, and the skills and competences involved are those which help learners map and navigate this landscape. But where digital and information literacy is addressed in HE this is typically done in ways that orient the learner to practices expected in the academic and/or disciplinary setting, or what Lloyd calls the “epistemic modality”. However, to become expert users of digital information outside HE, learners must also be introduced to social and corporeal (practice-based) modalities. This requires at least some collaboration, and for learners to gain experience with selecting tools and configuring their landscape, or what Wenger, White and Smith (2009) call stewarding.*

*This paper reports on research conducted on a number of small groups of learners as they worked in an innovative assessment environment that developed their stewarding capacity. Through content analysis of online discussions students can be seen employing discursive mapping techniques as they learn to configure their landscapes. This paper has implications for assessment design for digital skills as outlined in the EU’s Digital Competency Framework.*

**Keywords:** *digital and information literacy, informed learning, mapping, information landscapes, content analysis, online discussions.*

### **1. Introduction: a statement of the problem**

The digitisation of society produces a need to foster new skills and competencies in learners in higher education (HE). Institutions across the EHEA are expected to develop these, preparing graduates to move into positions in industry, civic and private life in which they are expected to make informed judgments using a wide range of information sources and tools for finding, organising and communicating this information, whether individually or in collaboration with others. These tools and sources are arrayed around the learner in what Lloyd (2010) calls an “information landscape”, and the skills and competencies involved — *digital and information literacy* (hereafter, DIL) — are those which help learners *map and navigate* this landscape (Whitworth 2020).

This paper describes how this view of DIL, as mapping, can be empirically observed emerging in learners as they work on collaborative tasks in a HE environment. This is DIL as more than just technical competencies, considered present if a learner can use particular software applications (as defined, for example, in the European Computer Driving License or ECDL), and beyond whether students know how to access information sources (such as journals) that are approved of in the academic setting. Rather (Polizzi 2019, 1, emphasis added):

*In order to contribute to the active participation of well-informed and critically autonomous citizens in democracy in the digital age, critical digital literacy needs to include knowledge about the digital environment where information circulates.*

This broader view aligns with the EU’s vision of a curriculum that ensures that not just the young, but all citizens are “able to creatively, critically and productively take part in a digital society” (Redecker and Punie 2017, 12). The EU’s Digital Competence Framework (Carretero, Vuorikari and

Punie 2017: hereafter, DigComp) includes both 'information and data literacy' and 'communication and collaboration' as core elements. When the digital competence of educators is also considered (Redecker and Punie 2017), digital teaching and learning skills include those of collaborative learning and self-regulation, as the competent digital educator in turn facilitates learners' digital competence through engaging them with DIL, communication, content creation, responsible use and problem solving with digital technologies (ibid, 8).

However, the pedagogical structures and didactic approaches needed to develop these competencies in learners are not necessarily fully understood or addressed in HE. The work of Lloyd (e.g. 2010, 2012) emphasises that higher education institutions cannot take for granted that instilling DIL skills in students in ways that support their academic studies (e.g. Rockman 2004) will necessarily be transferable beyond the university. Workplace and civic information landscapes, and the informational problems to which they give rise, are structured in different ways (Lloyd 2010; Bruce 2008). In HE learning outcomes are more stable and regulated, more individual, and more structured. In the workplace, although information needs are often more tightly defined, learning is also a 'fuzzier', less definable and more collaborative process. In other words, the information landscapes of HE and work are different in form, and the skills required to navigate them successfully are therefore also different.

Early on in *Information Literacy Landscapes* Lloyd says (2010, 2, emphasis added):

*Information landscapes are the communicative spaces that are created by people who co-participate in a field of practice. As people journey into and through these landscapes they engage with site-specific information. This engagement allows them to map the landscape, constructing an understanding of how it is shaped. It is through this engagement that people situate themselves within the landscape.*

Just as one can learn about a physical landscape, its general configuration and the specifics of the resources within it, by creating a map of this landscape, so Lloyd is suggesting here that the same principles can apply to an information landscape. But she does not offer any detail on what might actually be happening when learners are learning to map information landscapes in this way, and what the implications are for matters such as course and assessment design within HE.

Transferability of knowledge from place to place must be more than just replicating a learned process, because in different places, different practice architectures inevitably exist. But being a more effective user of diverse information systems, knowing how to navigate a landscape, making effective use of communications media to disseminate insights – all the basic characteristics of information systems (Saracevic, 1975) – these are reflexive capacities that help learners (Alkemeyer and Buschman, 2017, 11, emphasis added) 'become able to adjust and improve their participation in the context of not just one practice but many similar practices in a process of *learning self-structuration*'. This is an educational process that requires attending to different modalities of information outlined by Lloyd (2010, 161ff);

- the *epistemic* modality, meaning disciplinary knowledge appropriate to a given setting. This is the modality typically emphasised in HE assessment.
- the *social* modality, that is, "sources from the situated experience of collective participation, practice and reflection on action.... closely associated with reflection and reflexivity about professional practice and professional identity" (ibid, 164).
- the *corporeal* modality, "disseminated through demonstration and observation of practice or accessed through the tactile and kinaesthetic activity associated with actual practice" (ibid, 165).

This paper therefore provides an outline of mapping as a discursive and dialogic process related to the exploration and construction of an information landscape, via engagement with all of these different modalities. Discursive mapping is presented as a pedagogical concept that can help explore the development of digital competencies as outline in the DigComp framework, particularly those of information/data literacy and communication/collaboration. Via a brief case study of an online HE setting, the paper then explores a pedagogical approach that integrates DIL can be integrated into assessment design.

## 2. Theoretical basis

Despite her stating on more than one occasion that mapping is a process beneficial for the development of information literacy skills (see also Lloyd et al. 2013, 11), Lloyd provides little detail on what mapping might actually entail, pedagogically. This detail is added by Whitworth's investigation (2020), where examples of mapping are analysed. He concludes that: "mapping has value in learning to use, nurture and steward information landscapes because it is a means by which representations of relationships between relevant landscape elements can be developed, communicated and scrutinised within communities."

Whitworth also notes that the *products* of mapping are not limited to graphics, that is, maps in the everyday sense, including concept or mind maps (for the use of concept mapping in the development of DIL skills see also Hepworth and Walton (2009), Al-Abbasi and Stelma (2018)). Mapping is also a fundamentally *discursive* practice; a way of forming knowledge and creating cognitive schema (Bartlett 1932), ways of thinking that can be used as the basis for later judgements. The making of a map requires the mapmaker(s) to be positioned at focal points of information flows, to gather information, determine relevant elements, and establish how to represent these elements on the map field. As an outcome of this process, all maps thereby make propositions that can then be explored in the world (Kitchin et al 2009, 13-14). These propositions are dialogic in form before they are graphical, and Harvey goes so far to state that (1996, p. 111):

*The discursive activity of 'mapping space' is a fundamental prerequisite to the structuring of any kind of knowledge. All talk about 'situatedness', 'location' and 'positionality' is meaningless without a mapping of the space in which those situations, locations and positions occur. And this is equally true whether the space being mapped is metaphorical or real....*

Harvey also notes that (1996, 283-4):

*...multiple windows on a same reality, like the multiple theorisations available to us, can constitute a way of triangulating in on this same reality from multiple perspectives. Learning to see the world from multiple positions – if such an exercise is possible – then becomes a means to better understand how the world as a totality works .... This technique of conjoining information from different positionalities is a basic principle of all cartographic construction: to make an accurate map (representation) of the world we require at the very minimum a procedure of triangulation that moves across multiple points.*

This view of how knowledge – and a map of an information landscape — might be constructed is reflected in the work of those authors such as Christine Bruce who invoke the value of 'experiencing variation' (Bruce et al., 2006; Bruce, 2008) in teaching DIL. Bruce exhorts those working in the 'relational frame' of DIL education to employ methods that give learners this experience of variation in making informational judgements, or as Harvey puts it, learning to see a situation from multiple perspectives, and combining these perspectives into a map, a representation of this situation that can be communicated to others. Bruce suggests that this helps learners develop cognitive schema more akin to those of professionals in a given discipline: she calls this *informed learning* (2008).

In HE, informed learning approaches must expand beyond teaching only the epistemic modality of information: the DigComp and DigCompEdu frameworks also make this move explicit. Having copious disciplinary knowledge is one thing, but other modalities must come into play when that knowledge is successfully employed in a real-life situation (Badke 2012, 135-6, emphasis added): "Accumulated data require sense-making skills on two fronts — *determining what is reliable/significant/relevant* and *organising the data into a structure* that is manageable so that it can be used to address the issue at hand." These determinations are the practical manifestations — the performances — of information and data literacy. To make such determinations, and thereby select and organise relevant data and information, is a function of how individuals and groups bring cognitive schema to bear, and articulate these schema to develop a discursive map of the information landscape within which learners are working.

Schema are ways in which we organise the knowledge in our minds, and thus, part of the background against which we make judgments about information selection and the media of dissemination; they are learned, stored ways of thinking and (Blaug, 2007: 30):

*function to pick out relevant, "schema-consistent" data from the rush of information we regularly confront. As such, they are pre-existing selection criteria that manage cognitive overload and enhance the capacity to solve problems.*

Understanding and revealing the cognitive schema which structure not just the epistemic knowledge relevant to a given discipline, but how it is shared, practiced and relates to professional identity in that discipline (that is, the social and corporeal modalities), is an important aspect of higher education in that discipline. However, if learners are expected merely to accept the cognitive schema with which they are presented, this would merely be surface learning, a (power-laden) transference of knowledge from the 'authoritative' disciplinarian (that is, the tutor) to the passive learner. DIL in the forms described so far, however — as a practical, material capacity that would empower learners to become and remain digitally competent, thereby adaptable and responsive to unpredictable problems that they will face in the future — requires pedagogical practices that attend to how learners can be encouraged to make their own independent, albeit *justifiable*, judgements about information and technology and thereby generate their own cognitive schema.

The emphasis in the last sentence indicates that this is not anticipating the uncritical acceptance of judgements made. It is not the case that 'anything goes', cognitively, as long as it comes from a learner working independently (cf. Thompson 2008). There remains a role for the 'more able partner' who can review and, if necessary, critique the judgments and discursive maps that have been *articulated*: this partner may be a tutor or peer. Walton and Hepworth (2009, 156) describe the educational benefits of articulating judgements, and the basis for them:

*Cognitive constructivist learning, from an individual perspective, relates to building a mental map of the information landscape. Presenting, explaining and justifying this 'map' helps the learner concretise and internalise this view. From a social constructivist perspective the learner is learning about the information artefacts and tools that a specific 'community' uses and values.... They learn to use the general language of sources, such as 'portal', 'full text', 'open access' or 'creative commons', or those specific to the domain.*

### **3. Research basis**

In the academic year 2015-16 and 2016-17, the SPIDER project (Stewarding and Power In Digital Educational Resources) studied 20 small groups of 5-7 learners on a postgraduate course at a large UK university. These learners were using discussion boards within a Blackboard virtual learning environment to complete a series of assessment tasks. The tasks (described in more detail in Webster and Gunter 2018; Whitworth 2020) gradually reduced the amount of information that was provided to the groups in advance, thus requiring members to work together to gather information and make group judgements of relevance about it, in order that they could establish and propose collective solutions to the problems posed. The course recruited a mixture of on-campus and distance learning students (see Webster and Whitworth 2017), and every group contained representatives from both modes of study. As a consequence, groups could not meet face-to-face in their entirety, and members were obliged to use these boards (and, as will be noted later, a range of other online platforms) to communicate with one another. All of the work on these complex tasks had to take place in these online fora.

In consequence, a substantial proportion of these discussions — those in Blackboard — were recorded, and these accumulated into the dataset for the SPIDER study. The corpus of text available from the two years amounts to over 1 million words, and in ongoing work, the SPIDER team are undertaking a content analysis of these data, in order to determine whether and how students are using discursive mapping techniques as they integrate found information into their existing landscapes. In addition, Webster and Gunter (2018) also interviewed some of the students and the

course tutor. SPIDER is therefore a study of information seeking within an academic setting, but the approach — in line with the views of practice theory — is not focused on assessing cognitive change in learners. Rather, the attempt is to capture the richness of practice and dialogue that emerge from the interaction of the individual and the context. In this regard, its approach is akin to other studies of online communication and decision making e.g. Walton and Cleland (2017).

In formal educational settings we should not expect shared goals and a sense of cohesion to emerge simply because a discussion board is presented to a group of students with an expectation that simply from this, dialogue will flow. Rather, thinking about how the learning activities can be structured and facilitated in ways that might, at least for the duration of the task, give rise to this sense of community, is a key pedagogical design task and one central to the task of developing collaboration and communication skills as called for by DigComp. Pai et al (2015, 80) note that “[s]tructures, such as scripts, roles, and group rewards, have been identified as critical for fostering greater learning in groups than in individual contexts...”; such “scripts” can be (ibid, 81): “designed to increase specific cognitive behaviors associated with learning, such as summarizing, providing explanations, or asking questions...”. They also cite Aronson’s “Jigsaw” approach, in which (Pai et al 2015, 81):

*Each group member studies a subtopic of the material, meeting in “expert groups” to share information with peers from the other jigsaw groups specializing in the same subtopic, and then returning to their groups to teach their peers about their subtopic. Each student is like a piece in a jigsaw puzzle. Each part is essential for full understanding of the final product (Aronson 2002).*

To succeed at a task like this requires the group to develop effective information selection and management skills within itself, therefore, and, most importantly (ibid, 82-3, emphases added):

*when working in groups, multiple perspectives on the problem need to be negotiated to a common representation. Therefore, the representation tends to be abstract to be able to bridge various views. Collaboration provides an environment to generate more abstract representations which is not normally available when working alone.... While working collaboratively, individuals have to generate and explain their thoughts to each other. Vocalizing one’s thoughts can help to produce an organized cognitive structure of the material...*

These emphasised points strongly allude to the notion of discursive mapping, and the value that this process can have. Pai et al suggest that by articulating their positions, a common representation, an ‘organised cognitive structure’, can emerge among the student group. And the fact that these positions are being explicitly articulated, and recorded, on the online discussion boards is also significant. Walton and Cleland (2017) study online discussion board postings from a three-week IL intervention on a sports science course, and state that:

*In practice architectures (Lloyd, 2012) ‘sayings’ are the words and phrases members of a practice group use in their day-to-day situated interactions... It is argued here that this definition could be extended to include online textual postings generated by learners because: these communications are a demonstration of their comprehension as defined in Bloom’s taxonomy; they are carried out in an environment (Virtual Learning Environment) which provides a cognitive space; they embody more considered utterances about a topic than face-to-face conversation... and finally, they can form the basis for shared meaning within a community of practice...*

The online environment — Blackboard, in this case — is not just an inert space, nor even just a recording device; it is a constitutive part of the information landscape, and has a variety of features and affordances which students can bring to bear when it comes to selecting, mapping (or organising) and communicating information. The board becomes the “basis for shared meaning” and permits these *educational* practices.

Students were assessed with reference to a marking rubric (made public to them) that valued practices such as citation of the literature, taking on particular roles in the discussion, sustained rather



than sporadic participation and so on (the full rubric is given in Whitworth 2020). Grades were given by the tutor: peer assessment was not used.

In all, the assessment specification, the marking rubric, and structures of facilitation and support within this course, are designed in ways that promote certain informational practices, conducive to informed learning (Bruce 2008), over others. The design of these activities offers a framework or practice architecture in which students get practical experience in building around them an information landscape that helps them meet collective learning goals. They must set up a sociotechnical information system, one that helps them make selections, organise information and disseminate findings. And as it is what is posted on the discussion boards that is graded, the dialogues taking place as the group work together are not happening *in camera*, but are visible, open to scrutiny by the course tutor, the students themselves: and finally, the SPIDER research team.

#### 4. Findings

The initial information provided by the tutor for these tasks could be called a 'starter' landscape (or habitat — Wenger et al 2009). It is provided by the tutor, but is a habitat without inhabitants. For the first of the group tasks — the discussion of an academic paper (*viz*, Mishra and Koehler 2006) — groups are provided with all the information they need to complete the tasks (the paper itself). But in the second task, a role-playing simulation, and the third, a design task, groups need to gather more information than is provided to them, and thereby develop and extend this 'starter' landscape. Each group's landscape dynamically evolves over the period of the course, as learners filter into it information sources, technological tools, and associated discursive practices. This landscape thus has layers that sediment out (Lloyd 2010, 9-10) of the discussions and interactions that students have with each other, and with the tutor and teaching assistant.

Based on their prior experience and judgments of relevance, oriented by influences such as their own subjective understanding of tool affordances and their interpretation of how best to set up the landscape so the group can meet its shared learning needs most effectively (Wenger et al 2009), groups introduce new resources into this 'starter' habitat. These resources may be informational, and come from online sources and/or the literature, as these quotes illustrate (see also Whitworth and Webster 2019):

*Here is the link for the text "Knowledge for Literacy" as a reference:  
<http://www.shankerinstitute.org/blog/knowledgeliteracy>.*

*In my university... to be innovative in technology or deliver teaching in a different way is questioned, not by the faculty, but by higher management who see it as not conforming to the standard norms students are used to.*

*Since technologies are changing very fast, we must also relearn and readapt our own teaching practice. Mishra and Koehler say that technological knowledge is "the ability to learn and adapt to new technologies" (page 1028).*

We see here, respectively, the provision of information via URL; via narrative and personal experience; and via academic citation.

As well as these informational resources, students introduce technological tools into the landscape. This is rare in the first activity, but after that experience, groups frequently note that the discussion boards have limited functionality, and so, through a series of informed judgments, introduce other resources to their colleagues. For example:

*Me, [D] and [S] just had a Skype planning meeting to think things over; here's a summary of the discussion and what we will be doing*

Other groups use different tools. For example, Padlet becomes part of the habitat configured by four groups, but not the others. Student [B] here introduces Padlet to his group. He draws on his professional experience, and suggests associated information practices to the group:

*In class I like to use padlet.com to create discussion boards and students have even used it to do group work. I've created a padlet with the information. It's a huge poster board where we can all add information. I've added all the information [tutor] has provided and a quick comment. Let me know what you think? Should we give it a try?*

On occasion, individuals suggest reasons to avoid particular technologies (remember, these utterances are not made *post hoc* to an interviewer, but to other group members, via the online discussion boards):

*The main problem I find with LinkedIn is that it's overrun with recruitment agents, so I rarely use it. Twitter is OK for some stuff, but because it's so transient I find I miss things a lot and it feels like a lot of effort to keep up with it.*

This from Webster and Gunter (2018, 79) who quote an interviewee (unlike the ones above, then, this comment *is* made *post hoc* rather than on the boards):

*Our own VLE proved to be tricky sometimes. ...I valued that, as a team, we made use of different ways to communicate, group our ideas and give shape to our preliminary decision and strategy. Gmail, Facebook, Google Drive, and the chat room in Blackboard helped us explore the use of social media and Web 2.0 tools to better communicate and write collaboratively.*

By the end of the series of activities, each group's learning environment thereby looks different from those of other groups and different from the 'starter habitat'. The group's information landscape has evolved, becoming a record of the judgments of relevance that have been made by members. These judgments are based on the prior experience of individuals, and their application of DIL in work and everyday life, but are then validated by colleagues according to their relevance for the specific, shared task that the group has to fulfil. The group learn to develop practices that help them work together as a group and that are in a dynamic, mutually-reinforcing relationship with the technologies and sources that they introduce into the landscape. As Wenger et al (2009, 137) write: "Shared assumptions about how to use [the technologies] constitute practice." These practices are taken forward from activity to activity without needing to be renegotiated.

Groups also reflect on their prior performance and consider how the practices, technologies and resources in the habitat might be better used subsequently:

*Me, [Y] and [S]... have already discuss on how we should form our thread in this forum so that it'll better organized than our previous discussion (Hehehee.. we think it was pretty cluttered). [16/Black]*

In each group, what is emerging is a set of shared assumptions about the landscape, and ways of navigating it most effectively. Thus far then, these illustrations have shown how group members establish a structure for their information landscapes.

The mapping process has also been applied to the material contexts — that is, the places — which act as foci for these activities, giving the members of these groups a *single, shared* focus for the judgments of relevance they are being asked to make. Through discursive mapping, group members co-create a representation of a landscape that then becomes the basis for further judgments.

This aligns with Steinerová's (2010) findings regarding information behaviour in an academic setting, and the value of graphical and discursive mapping in helping with both phases of such work

— the initial *orientation* stage, in which learners survey the field and gather information into a landscape, and the *analytic* stage, where on the basis of what was found and structured in the orientation stage, decisions are reached. (See also Kuhlthau 1993.) These successive stages are most evident in activity 2, in which the groups must make judgments about a context that is unreal: or, at least, fictitious, as it at first exists only as the scenario presented by the tutor, that outlines a problem faced by “Mackenzie College”. But students can be observed working to map and, thus, reach agreement on their views of the context and the problem. As noted in Whitworth and Webster (2019, emphasis added);

*Members of the groups can be observed introducing and validating informational and technological resources to other group members, and working to configure their information landscape in ways that then allow them to make judgments about found or encountered information in ways that could not have been possible for them prior to the dialogue.*

The scenario outlines the problem and offers advice about issues that the groups might consider in their discussions. But the landscape provided in these notes is limited, and students are told this. In the orientation stage, groups must bring further information into their landscape, incorporating resources that they judge to be relevant, including citations from the literature, and information gleaned from other groups, playing different roles in the simulation (the groups in each game are: senior management; IT services; the student body; an innovative group of ‘tech-savvy’ teaching staff; and other teaching staff).

As a result of this information seeking, and subsequent online discussion, groups each develop their own perspective on the scenario, and answer for themselves the question of how “Mackenzie” should formulate its e-learning strategy. Contrast these posts, from two different groups that are playing the same role, the IT services department. Both groups have begun with the same initial information (that is, the scenario), but come to agree on different priorities. For the first group these are speed of access and students’ accessing the VLE after graduation; for the second, wifi, training and teaching.

*Questions we (the IT team) have to deal with by the end of this week: What should/can we do to make the VLE a faster platform? Can we get in touch with the provider and see if they have any updates coming up next year? For sure, we don't want to move into a different VLE. Is there a possibility for us to help the students maintain their access after they graduate? This might be a real satisfier for the students.*

*So far our ideas seem to be around: Changes in infrastructure: potential investment in wifi; Changes in teaching: potential changes in the adoption of apps as an IT team we need to look at how we could support this both through infrastructure and possible training. This might be a potential digital change agent project (students and staff working together)*

What is significant is how these interpretations of the context — that is, groups’ discursive maps of “Mackenzie College” and what the students have determined is relevant to include in them — are carried forward and used as the basis for judgements made in the analytic stage. The transition takes place after the group playing the managers in this simulation communicate a draft e-learning strategy for Mackenzie, the outcome of their own group deliberations. Other groups are then required to publish their collective reaction to this decision. Take this quote for example, made by the group playing the ‘tech-savvy’ academics:

*... this is good information for us to use and saves us time.... this strengthens our argument for ‘going it alone’ and they recognise us as being well trained.*

This judgement — that the conclusions reached by the management group strengthens the argument for “going it alone” with educational technology — is *authentically* made, even though it



refers to a *simulated* context. There is no external “reality” to Mackenzie, and therefore, any criteria against which the group (or any other group) bases its judgments must be that which *they negotiate and agree upon* through both intra- and inter-group dialogue. Through these online dialogues, groups agree upon basic informational constructs such as priorities and problems for Mackenzie. These constructs become the basis for the judgments of relevance that each group makes when it comes to analyse the “senior management” group’s decision.

For example, largely because of its containing student [R], a distance learner who was employed as an academic librarian, the group quoted here was the only one of the 20 groups to draw attention to the fact that the library was not discussed in the original scenario. The rest of the group concur, and thereafter the library becomes an evident part of this group’s discursive map of Mackenzie in a way it does not for other groups. Responding to the management group’s decision, [R] writes:

*Have the management integrated the librarians, the students want this and we do too. How is the new situation an improvement for us? Will it make any difference to our teaching and delivery of our courses and our research? I think we need more support from the management and more recognition.*

In the same group discussion, student [A] here quotes information from the scenario (the indented paragraph below), and builds on it with a judgment about what is the best next step for the group to take within this simulated situation:

*we already have long experience with this issue because we manage to teach distance learners. In other words, our expertises have formed as a respond to learning process which is distance learning.*

*" Mackenzie’s distance learning programmes are highly rated and are led by a team of academics/researchers who are internationally regarded as innovators in the teaching of History at a distance. "*

*So, I suggest to contact with managers team to discuss the idea of introduce our experience to other colleagues either IT team or other academic team?*

[R] agrees with [A] that this will have benefits for their group:

*this could be a good opportunity for us to improve our profile at the university and therefore to get some recognition for the quality of teaching we deliver in the department.*

Although the context is simulated, these things can be confidently stated because the discursive map that they have negotiated and reached consensus on has been integrated into their information landscape, and for each group, is now no less “real” than the assessment task itself. A “register of correspondence” (Cosgrove 1999, 1) has developed between the place about which decisions are being made (in this case, Mackenzie) and the discursive map that the group have performatively created via their discussion on the boards, which can guide their own self-assessment, help them scrutinise judgments made. The map has helped the group make connections between informational resources, and it has become an agreed-upon basis for action that does not need to be renegotiated and can serve as the basis for group judgments of relevance regarding found and offered information. A map makes propositions; and that these propositions can then be explored in the world, that is, the place represented upon the map — it does not matter that Mackenzie has no physical cognate: it nevertheless acts as an *information ground*, a “sociophysical location” (Hultgren 2009, 140) *which both facilitates access to information and makes it relevant*. Mackenzie only exists as a PDF (in effect), but it has enough depth for the task at hand.

## 5. Discussion and Conclusion

For a student to make any proposition to their peers — asserting the value of an online resource, say, or offering an idea for a new technology for the museum — they must articulate that proposition on the online discussion board, and make an utterance of some kind that contributes to the consequent formation of the discursive map. Responses to these utterances, whether they come from the tutor/TA or, in more in-depth ways in this setting, from peers, validate and position each claim to knowledge. As exhorted by Bruce (2008), they are learning to see the world from multiple positions, ‘experiencing variation’, so, through this dialogue, the students *triangulate* on the landscape (Harvey 1996, 283-4); bringing multiple perspectives together in a single interpretive framework, or discursive map. At least transiently, that is, for the duration of the activity, the map becomes a *locus of collective memory* (Harvey 1996, 417); it was acting as one while it was being created, and, as the record of the dialogue still exists, it remains one. The technological tools in use (Blackboard); the regime of assessment; and the subsequent SPIDER research methodology: all are processes that (in slightly different ways) have given the dialogue a permanence, and helped reveal the dialogic moves that are made by the learners as they construct, map and navigate their information landscapes.

Effective pedagogical design for informed learning involves this *placing* of the learner, giving them a *position* from which they can develop a perspective on the landscape. That does not mean it is desirable for students to stay in this place. Instead it should be seen as a starting point from which they can learn to navigate the landscape: the provision of a (discursive) map to help the learner in the early stages, but a map that they can expand upon, review and possibly redraw if their investigations require it. In the case discussed here, these possibilities are opened up firstly by the design of activities, but later on, the signposting by tutors and peers of additional resources that may be useful in the landscape. Learners in these groups have been observed teaching each other mapping and other associated practices, rather than being reliant on the tutor. These processes, which Wenger et al (2009) would term *stewarding*, turn the assessment specification from a plan (which ‘extinguishes contextual potential’) into a map, a tool for exploration, ‘a generative means, a suggestive vehicle that “points” but does not overly determine’ (Corner, 1999, 228). This is illustrated by the variety of ‘Mackenzies’ which come into being and the different practical settings (museums) in which students actively apply their knowledge.

While the educational context explored must be different in each potential case, this is an approach to the development of, and assessment of, informed learning that could be applied across the EHEA. The DigComp elements of information/data literacy and communication and collaboration are directly reflected in the pedagogical framework that has been explored in this paper. The research reported on indicates how informed learning approaches like this one integrate DIL into teaching in a way that would improve the chances of institutions meeting their obligations to graduates, in the sense of preparing them more fully to enter the workplace and civic life, and developing a broad set of competencies in DIL. As Badke notes (2012, 93): While the context explored must be different in each potential case, this is an approach to the development of, and assessment of, informed learning that could be applied across the EHEA, as it would integrate DIL into teaching in a way that would improve the chances of institutions meeting their obligations to graduates, in the sense of preparing them more fully to enter the workplace and civic life. As Badke notes (2012, 93):

*... educators are going to need to move from teaching about their disciplines to enabling their students to become disciplinarians. The expression, ‘welcome to my world’, encapsulates the goal ... We must invite students into our world and there reproduce ourselves in them, turning our students into active practitioners in our disciplines.*

## 6. References

- Alabbasi, D., and Stelma, J. (2018). Using Ketso in Qualitative Research With Female Saudi Teachers. In *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* (Vol. 19, No. 2, p. 24). DEU.
- Alkemeyer, T., and Buschmann, N. (2016). Learning in and across practices: Enablement as subjectivation. In Hui, A., Schatzki, T. and Shove, E. (eds.) *The Nexus of Practices: Connections, constellations, practitioners* (pp. 20-35). Routledge.
- Badke, W. B. (2012). *Teaching Research Processes: The faculty role in the development of skilled student researchers*. Oxford: Chandos.
- Bartlett, F. C. (1932). *Remembering: A study in experimental and social psychology*. Cambridge University Press.
- Blaug, R. (2007). Cognition in a Hierarchy. *Contemporary Political Theory* 6/1, 24–44.
- Bruce, C. S. (2008). *Informed Learning*. ACRL.
- Bruce, C. S., Edwards, S. L. and Lupton, M. (2006) Six frames for information literacy education. *Italics* 5/1.
- Carretero, S., Vuorikari, R., & Punie, Y. (2017). *The Digital Competence Framework for Citizens*. Publications Office of the European Union.
- Corner, J. (1999) The agency of mapping: Speculation, critique and invention. In Cosgrove, D. (ed.) *Mappings* (pp. 213-252), Reaktion.
- Cosgrove, D. (1999). *Mappings*. Reaktion.
- Harvey, D. (1996). *Justice, Nature and the Geography of Difference*. Blackwell.
- Hepworth, M., and Walton, G. (2009). *Teaching information literacy for inquiry-based learning*. Elsevier.
- Hultgren, F. (2009) *Approaching the Future: A study of Swedish school leavers' information-related activities*. Valfrid.
- Kitchin, R., Perkins, C. and Dodge, M. (2009). Thinking about maps. In Dodge, M., Kitchin, R. and Perkins, C. (eds) *Rethinking maps: New frontiers in cartographic theory* (pp. 1-25), Routledge.
- Kuhlthau, C.C. (1993). *Seeking meaning: A process approach to library and information services*. Westport, CT: Greenwood.
- Lloyd, A. (2010a). *Information literacy landscapes: Information literacy in education, workplace and everyday contexts*. Chandos.
- Lloyd, A. (2012). Information literacy as a socially enacted practice: Sensitising themes for an emerging perspective of people-in-practice. *Journal of Documentation* 68/6, 772–783.
- Mishra, P., and Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers college record*, 108(6), 1017-1054.
- Pai, H. H., Sears, D. A., and Maeda, Y. (2015). Effects of small-group learning on transfer: A meta-analysis. *Educational psychology review*, 27(1), 79-102.

Polizzi, G. (2019). Information literacy in the digital age: why critical digital literacy matters for democracy. In Goldstein, S. (ed.) *Informed Societies: Why information literacy matters for citizenship, participation and democracy* (pp. 1-24). Facet Publishing.

Redecker, C. (2017). *European framework for the digital competence of educators: DigCompEdu*. No. JRC107466. Joint Research Centre (Seville site), 2017.

Rockman, I. (ed.) (2004) *Integrating Information Literacy into the Higher Education Curriculum*. Jossey-Bass.

Steinerová, J. (2010). Ecological dimensions of information literacy. *Information Research* 15/1.

Thompson, D. (2008), *Counterknowledge*, Atlantic.

Walton, G., and Cleland, J. (2017). Information literacy: empowerment or reproduction in practice? A discourse analysis approach. *Journal of Documentation*, 73(4), 582-594.

Webster, L., and Whitworth, A. (2017): Distance learning as alterity: facilitating the experience of variation and professional information practice. *Journal of Information Literacy* 11(2).

Webster, L. and Gunter, H. (2018). How power relations affect the distribution of authority: implications for information literacy pedagogy. *Journal of Information Literacy*, 12(1).

Wenger, E., White, N., Smith, J. D. (2009). *Digital Habitats: Stewarding Technology for Communities*. CPSquare, Portland OR..

Whitworth, A. (2020). *Mapping Information Landscapes*. Forthcoming, Facet Publishing.

Whitworth, A. and Webster, L. (2019). Digital and Information Literacy as Discursive Mapping of an Information Landscape. *Proceedings LILG-2019 conference*, Frankfurt.