240530 IARTEM

Considering the unthought materialities of digital media. Analyzing a corpus of educational resources on the environmental impact of digital technologies (Wallonia-Brussels Federation, Belgium)

In this talk (***slide 1***), I'll be discussing **resources dedicated to the environmental impact** of digital technology published on E-classe (***slide 2***). E-classe is a website that self-identifies as a "platform" providing resources to the **French-speaking Belgian educational community** (*in other words, you need to belong to this community to have access*). It was launched in **2019** as part of a **digital strategy** included in a wide-ranging reform of the education system in the *Wallonia-Brussels Federation* in Belgium (***slide 3***). By analyzing these resources, my intention is to provide answers to the following question: *How (i.e., through which **knowledge** and **competencies**) do the educational resources on the environmental impact of digital technology proposed for French-speaking Belgian education aim to develop learners' digital media literacies?* In other words, to what extend could it be related to **media education** as a set of concepts and methods aimed at increase learner's media literacy? My talk will be divided into two parts: first, I'll provide some **background and theoretical context**, and then present the **corpus** of resources studied. I will then present the results of my analysis, which is mainly **diagnostic** in nature.

Digital media in the field of Information and Communication Sciences/Media Education

Media education draws on a number of scientific disciplines. As media and media practices continue to **evolve**, so does the **scope** of its action. This means regularly questioning how the 'media' is constructed as an object, with what kind of knowledge, and for what **educational and social purposes** — this is what Pierre Fastrez and Norman Landry note in the introduction to a recent book on research methods in media education. There, they propose to define media as both **means of communication, organization, formats, and technical devices** (***slide 4***).

Media education aims at developing **media literacy** (***slide 5***), to put it simply, which is the ability to make social use of media. Fastrez and Landry recall that it can be conceived as a ***praxis***, that is to say, 'the practical application of theoretical knowledge for normative and

transformative purposes' (*Ibid*., 4). In this way, it could take stock of the **environmental impact of digital media** and conduct **social action**.

Regarding these issues (***slide 6***), scientific literature in information and communication sciences has provided knowledge for studying the unthought materialities of digital media as well as methodological perspectives for education. For instance (***slide 7***), in his book *Mediarchy* (Citton 2019), Yves Citton relies on **media archaeology** to provide a more detailed understanding of the material aspects of digital devices, *a.o*. their persistence in the natural ecosystem and the planned obsolescence embedded at the micro-level of design (Hertz et Parikka 2012). He identifies courses of action for media education, which focus on the work of **attention** to be carried out by the user of digital media. Another example is provided by the **summary textbook** directed by Souchier, Candel and Gomez-Mejia (Souchier et al. 2019), *Le numérique comme écriture*, which explains in detail how digital media call on our **operating memory** to lead us to transfer our everyday practices to digital devices. From this perspective, the **escort discourses** of digital media appear as **prescribers of practice** that lead us to stop thinking about their material dimension, for example by using terms like “virtual”, “the cloud” and so on.

From another perspective, in the field of media education, David Buckingham calls for **re-thinking media literacy** at the age of *digital capitalism* by considering it through a *bigger picture* (Buckingham 2020). This shift in focus means moving beyond a list of 'good and bad digital practices' to an informed understanding of the social and political issues involved. In this respect, *digital capitalism* is obviously connected to the unlimited exploitation of material resources for profit.

My point is that when it comes to this educational perspective (***slide 8***), we are quickly limited to two **alternatives**: (i) **informational resources** that need to be adapted by the teacher, which is very difficult to know exactly how, and (ii) a **checklist** of good and bad practices (*eco-gestures* in this case) that raises questions about the critical competencies to be developed. Furthermore, the **knowledge** used in this education barely considers the contributions of information and communication sciences or media education. The disciplinary framework is rather unclear or disparate, which is not unexpected if we consider the institutional literature. The 2019 *Basic and Secondary Education Code* identifies a series of cross-curricular areas: “promoting citizenship, health, media education, the environment and sustainable development” (Art. 1.5.2-3. - § 1 er). So, education about the environmental impact of digital technology is not supposed to respond to a disciplinary curriculum, nor is it clearly related to media education. To answer my research question, I’m going to conduct a **survey using the**

E-classe portal. This will give me access to a corpus of resources and provide information on their *editorialization*, understood as "selecting texts, setting up collections, establishing thematic indexes, and regularly introducing editorial focuses based on audience type" (Mounier et Dacos 2010, 63). Editorialization of resources can help us understand how the environmental impact of digital technology is anticipated as a **object to be taught** and provides insight into how the institution perceives the legitimate authorities for discussing, framing, and practicing education for sustainable development. I will then determine to what extent these resources can be used as **learning materials**, *i.e*., resources that can be integrated into a teaching situation to develop learners' competencies.

E-classe as a digital workspace

E-classe is conceived as a **digital workspace** (***slide 9***) dedicated to teachers documentary practice (*i.e.* finding and building resources for teaching), while another digital workspace, Happi, is dedicated to in-class teaching (I won't show it). We can see on the top of the page (***slide 10***) the four anticipated professional practices: *discover*, *create*, *share* and *teach*. So connections can be established by creating resources and learning paths using E-classe and then implementing them on *Happi* by a tool provided in the 'create' section (which can also simply be used to offer resources to the educational community). E-classe and Happi are linked by the teacher's unique professional identifier.

Resources are categorized according to three methods of use in lesson preparation (***slide 10***): '**operating in a learning situation'**, '**designing a course'** and '**enriching reflection and practice'**. Without going into too much detail, we can say that E-classe combines the cultural models of (i) a **professional network**, in terms of personalization and community, (ii) a **virtual library** for resource exploration, and to some extent (iii) a **platform for the distribution of cultural products**, in terms of the recommendation and evaluation system (Tréhondart et Carton 2020) (*back to* ***slide 2*** + ***slide 11***). *Here my point is not to conduct an accurate analysis of E-class, which could be a topic in itself.*

There's a dedicated file on E-classe gathering educational resources on "The environmental impact of digital technology" (actually my translation of "L'impact environmental du numérique", which orient the meaning in a certain way)[1]. This file contains 28 items, including

[1] e-classe produces folders containing resources for teaching specific subjects, so it's reasonable to assume that, as the folder's name suggests, it contains all the platform's resources relating to that subject.

a focus with the same title (***slide 12***) produced by the General Service for Digital Educational Technology. It defines a series of key concepts such as *sustainable development*, *digital sobriety* or *digital responsibility*; then provides quantified data on the environmental impact of digital technologies; and details ways to take action at the school level and educate students in digital responsibility.

This resource is specific because it is presented as a focus produced by an institutional authority (*Wallonia-Brussels Federation* and Service Général du Numérique Éducatif) and supported by the resources in the file. We can relate such a document to *curriculum material* dedicated to guiding educational action. (Reverdy 2014). If we consider the tags, the whole file is tagged "media education", although the focus is not. On the contrary, the focus is tagged “sustainable development”, while the file is not. As a result, we're already seeing **instability** in the categorizations allocated to this non-curricular subject, and the disciplines expected to address it. Both media education and education for sustainable development are considered in institutional texts and by their editorialization on E-classe as **transversal issues** (as we can see on ***slide 13***).

I'm going to identify the different types of resources offered to teachers in this file (***slide 14***). For this, I need to narrow the scope and identify what constitutes *learning materials* and what doesn’t (and thus can be related to *curriculum educative materials* dedicated to teachers). As a reminder, I would like to know *how the educational* ***resources on the environmental impact of digital technology*** *aim to develop learners’* ***digital media literacies*** *(with what knowledge and methods)*. A first answer could be find in what they're going to do in class, and how the teacher is going to design the lesson. Hansen and Gissel define learning material as follows: “From our standpoint, ‘learning materials’ covers all materials and tools used as aids, with learning as the goal in an educational context” (Hansen et Gissel 2017, 124). So this is a broad perspective. The authors distinguish three categories:

- *“Didactic learning materials* are characterized by having been especially developed for teaching and therefore with a didactic intention (e.g. a textbook for teaching mathematics or an ICT-based teaching system).
- *Functional learning materials* can support processes in the teaching for both the teacher and the students. These could, for example, be tools such as an interactive smart board or a word processing program.
- *Semantic learning materials* are texts which have been produced for purposes other than teaching (e.g. a novel or a food recipe). Semantic learning materials must be adapted

didactically by the teacher in order to become suitable as learning materials, i.e. they must be adapted to teaching situations." (*Ibid., 125)*[2]

To distinguish between these categories among the resources in my corpus, I relied on both E-classe labels and a consultation of the resource itself.

First, didactic learning materials (***slide 15***) (*I mean didactic in the sense of being designed for classroom teaching, with the pupil as the recipient; maybe I could have choose to include informative materials oriented towards didactic applications but I didn't here*) designed for **classroom teaching**, with the **pupil** as the recipient (*I could have chosen to include informative materials oriented towards didactic applications, but I didn't here*). There are only four, and what's striking is that (i) none is related to media education by its disciplinary tag; (ii) generally speaking, the disciplinary field is not precise, nor is the anticipated audience (except the first it's for everyone, primary and secondary alike) [*for this I am using the tags*], and (iii) the authorities are from abroad (France and Switzerland)[3].

	title	authority	anticipated audience	disciplinary tag
16	L'environnement à l'ère numérique. L'impact environnemental du numérique expliqué aux jeunes.	Académie suisse des sciences techniques (SATW)	secondary school	sciences; numérique; EPC; religion; morale
21	Découvrez l'impact de la vie d'un apprenant en ligne. Une infographie	République française; ADEME	primary school; secondary school	numérique; EPC
22	Malle pédagogique "conscience numérique durable"	Conscience numérique durable [site web]	primary school; secondary school	numérique; EPC; religion; morale
25	La pollution numérique. Dossier d'accompagnement pédagogique	Ligue de l'Enseignement de Paris	primary school; secondary school	numérique; EPC; éducation par le numérique

One recurring theme in these resources, as in the focus brochure, is to raise awareness through data and infographics that show the impact of digital technology on the environment and to encourage eco-gestures based on an analysis of practices. A more complex resource is the 'Malle pédagogique consciences numérique durable,' a website that displays a wide number of resources […]. The perspective here is more scientific and ethical than media-related.

Then **semantic learning materials** (NB = 13, ***slide 16***), *i.e.*, texts that do not have a didactic intention *per se* but can be integrated into a teaching situation:

[2] We use these categories for convenience in this analysis, in that they enable us to distinguish between several types of resource. However, they can be questioned in that a didactic learning material will itself contain, in principle, semantic learning material and, to be used, will require a media support.
[3] Malette pédagogique: projet européen mais Saint-Etienne (FR).

	title	authority	anticipated audience	disciplinary tag
1	La pollution numérique	RTBF-SONUMA; RTBF	secondary school	*numérique*
2	L'impact du numérique sur le dérèglement climatique	RTBF-SONUMA; RTBF	secondary school	*numérique*
3	La puissance des supercalculateurs	RTBF-SONUMA; RTBF	secondary school	*FMTTN*
4	Les tickets de caisse numériques polluent également	RTBF-SONUMA; RTBF	secondary school	*numérique*
5	Urgence climatique: le numérique	RTBF-SONUMA; RTBF	secondary school	*FMTTN; EPC; économie; numérique*
6	La pollution numérique	RTBF-SONUMA; RTBF; FW-B	primary school; lower secondary school	*ECA; sciences; EPC*
8	Les effets rebond du numérique	CNRS	secondary school	*sciences; numérique; FES; EPC; religion; morale*
12	Pollution numérique : 5 gestes du quotidien pour réduire notre empreinte carbone sur Internet	RTBF	primary school; secondary school	*numérique; EPC*
15	Effets de la transition numérique sur le secteur de l'environnement en termes d'activités, métiers et compétences	Forem	upper secondary school	*éducation par le numérique*
19	Agir au quotidien : réduire son empreinte numérique. Tous nos usages sur Internet ont un impact	WWF	primary school; secondary school	*numérique; EPC; éducation par le numérique; éducation aux médias*
23	Consommation énergétique : zoom sur la pollution numérique	France Télévision	primary school; secondary school	*sciences; numérique; EPC; religion; morale*
26	La sobriété numérique. Comment remettre en question nos usages pour impacter l'environnement ?	The Shift Project	primary school; secondary school	*numérique; EPC*
28	Calculer l'impact environnemental des usages IT	Régional-IT; FW-B; Maxime Schurmans (mémorant ULB)	primary school; secondary school	*sciences; numérique; EPC*

Three quarters (10/13) come from the **media**, mainly Belgian public broadcasters: the RTBF is the Belgian audiovisual public service and SONUMA its archive service; plus articles from other producers. For instance, the first six resources are program or news excerpts lasting several minutes, and an 18-minute program. This type of informative resource can easily be integrated into a classroom learning activity; moreover, it does not itself help develop competencies through methods. Again, it is about the concrete impact of digital technologies on environment (regarding pollution, climate, etc.)[4]. The only one that's tagged with "media education" is the article from the WWF, maybe because it embedded a link to an app "We Act for Good" for monitoring eco-gestures (***slide 17***). The latter can be considered as a potential **functioning learning material**, but the link with media education is not really obvious (using an app in order to monitoring eco-gesture is not really being media literate).

Besides, if the articles from the CNRS (popularization in *Eco-Info*), The Shift Project or Regional IT could be suitable for upper secondary school, they don't fit with the anticipated audience as "primary school". Alongside this, other resources can clearly not be seen as learning materials, but rather as **informative resources for teachers**. There are 14 (actually 13 since one is irrelevant since the content really has nothing to do with the environmental impact of digital technology, ***slide 18***), whereas certain resources are multi-tagged in that they may be composite, in the case of kits, or correspond to different and combined aims. We propose to use the category of *curriculum educative materials* could be referred to resources that intended to promote teacher learning instead of or in addition to promoting student learning (Davis et Krajcik 2005; Drake, Land, et Tyminski 2014; quoted by Reverdy 2014, 9) so "educative" refers

[4] Including this time a balance with opportunities provided [to be detailed]

actually to the teacher[5]. We can see here that most of these resources are proposed by the state or French organizations, and offer more or less recent studies, as well as roadmaps and action plans.

	title	authority	anticipated audi	disciplinary tag
7	Feuille de route sur l'environnement et le numérique	Conseil nation	upper secondary	numérique; FES; EPC
8	Les effets rebond du numérique	CNRS	secondary schoo	sciences; numérique; FES; El
9	L'impact environnemental du numérique	SGNE; FW-B	primary school; s	numérique
10	L'impact environnemental de nos usages numériques	FW-B; CSEM	primary school; s	numérique; éducation aux m
11	*Réfléchis avant de publier [irrelevant]*	*Child Focus*	*lower secondary*	*numérique; éducation aux m*
13	La face cachée du numérique	République fra	primary school; s	EPC
14	Les clés de l'énergie, le nouvel outil éco-école. Guide pour découvrir, e	Terragir	primary school; s	numérique; EPC
17	Outils numériques et éducation à l'environnement	Ifrée (Poitou-C	primary school; s	sciences; numérique; EPC; r
18	Livre blanc numérique et environnement. 26 actions concrètes pour fai	Iddri; Fing; WV	primary school; s	numérique; EPC; religion; mo
20	Les impacts du smartphone. Un téléphone pas si « smart » pour l'enviro	République fra	primary school; s	numérique; EPC; éducation p
22	Malle pédagogique "conscience numérique durable"	Conscience n	primary school; s	numérique; EPC; religion; mo
24	Empreinte environnementale du numérique mondial	GreenIT.fr	primary school; s	numérique; EPC
27	Guide pratique pour des achats numériques responsables. La démarch	République fra	primary school; s	numérique; EPC
28	Calculer l'impact environnemental des usages IT	Régional-IT; F	primary school; s	sciences; numérique; EPC

In principle, teachers seek for information that is **relevant** to the curriculum/educative curriculum materials are designed for this. **Relevancy** is constrained by the curriculum (Reverdy 2014: 6), meaning, are they likely to help achieve the learning objectives (*so we can suppose that if they have been validated by E-classe they are considered as such*). But regarding LO on the issue of environmental impact of digital technology, they aren't properly defined, since it is **supposed to be transversal**. Here again, only one relevant resource address the issue of environmental impact of digital technologies from the field of media education and therefore has the specificity of directly connecting the information provided with the development of media literacy competencies. As for the rest, here again, science/technics and ethics are mainly represented.

Provisional conclusions

At first (**slide 19**), we can mention the fuzziness of disciplinary anchorage regarding the resources on the environmental impact of digital technologies, from the institutional literature to the editorlialization categories. And this maybe for the following reason: "digital" is the common theme, but offers no clear perspective. In French, it is « le numérique » as a substantive

[5] "The focus of curriculum designers is shifting to supporting teachers' capacity to enact curriculum materials—to read, understand, and adapt available curriculum materials to meet the specific needs of the students in their classroom while remaining faithful to the materials' intended outcomes." (Drake, Land, et Tyminski 2014). Incidentally, the category is not entirely satisfactory, since these resources can be purely informative or include curriculum-related teaching aids.

adjective (digital… technology, media, objects ?). Most of the time, the perspective is not the media one, but **scientific/technical or ethical**. Knowledge from the information and communication sciences is barely called upon.

There is no competency framework, not even in the *focus* that is the closest to a program, even if concepts are defined there (but this has nothing to do with concepts for media education that are *representation, language, audience* and *production*). Contrary to what the title of my talk might imply, materialities are not unthought of but rather considered through the lens of **production and use**, with many quantifications and infographics, but this perspective is not really in the critical, investigative realm of media education (for instance investigating digital capitalism through design, imaginaries, representation carried by discourses, etc. [*planned obsolescence is addressed in CSEM's Resource, however not examined at the level of micro-design*]).

Because of this limited institutional framework, there are very few didactic learning materials. The resources are essentially of **informative nature**, whether they are produced by media such as Belgian public broadcasting, which can play the role of **semantic learning materials**, or reports and white papers, which can play the role of **curriculum educative materials** proposed by the portal insofar as they are **relevant to learning objectives** (Reverdy 2014). However, in the absence of a framework, these remain implicit. *This could be refined as curriculum educative materials can be either information or didactics proposals linked to defined LO (the latter being more explicit in terms of concepts and methods: eg.* 9, 14, 17*)*.

So it's not easy to detail methods (***slide 20***), but the recurrence of *eco-gestures* should be mentioned[6], and exposure to information seems another privilegied method considered the number of resources created by media (audiovisual or press) that can be used as semantic learning materials. And so, to make the link with the beginning of my speech, I'd like to point out the absence of didactic transposition from recent research in information and communication sciences (Souchier et al. 2019; Citton 2019; Parikka 2012), which would offer opportunities to complement existing approaches and perhaps compensate the dominant binary approach through the good and bad practices underpinning eco-gestures.

[6] Also see 9, 14 [inquiry-based learning], 17…

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Format of parallel sessions: 15 minutes of presentation each participant, 5 minutes questions and 15-20 minutes of final debate.