Rethinking Learning Towards Education 4.0

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Rapid changes and disruption in the world of work invite all of us to rethink learning and education. Industrial Revolution 4.0 or Industry 4.0 known as digital age with big data, artificial intelligence and internet of things has great impacts on many sectors and leads to new terms such as Education 4.0 (e.g. Iyer, 2018; Saxena & Bhat, 2017; Schwab, 2016).

Education 4.0 shifts mindsets and approaches in learning and teaching. Digitalisation enables learning to occur anywhere which makes learners key actors of their own learning. Teachers change their role to facilitators of learning. Instead of focusing so much on degrees, learning concentrates on relevant competences. Education 4.0 refers also to ecosystems of educational institutions and the world of work, which produce innovations and evolve in the change. It means that in education we do not just adapt to changes, but we actively build our own meaningful future. In Education 4.0, the traditional ways of implementing education are not enough, but we need to rethink learning and education to match the needs of the changing world. The challenge is global, but in rapidly developing countries, such as in Vietnam, it might be even stronger. In this article, we want to discuss our first perceptions of developing Education 4.0. in Asian-European collaboration.

The EMVITET project developing Education 4.0 in Vietnam

The EMVITET (*Empowering Vietnamese VET teachers for transformation towards Education 4.0*) Erasmus+ capacity building project will create a new learning ecosystem for Education 4.0 in Vietnam, based on student-centred learning, competence-based

education, collaboration and networking in digital environments, and sharing knowledge through a community of practice.

Häme University of Applied Sciences (HAMK) with strong expertise in developing education and Ho Chi Minh City University of Technology and Education (HCMUTE) as a leading university in Vietnam prepared the EMVITET project in collaboration with two other Vietnamese universities: UD-UTE (University of Danang, University of Technology and Education) and LHU (Lac Hong University), and with three Vietnamese colleges: Hue Industrial College (HueIC), College of Technology II (HVCT) and Ho Chi Minh City Industry and Trade College (HITC). Two European universities, KU Leuven from Belgium and Dublin City University (DCU) from Ireland, were invited to join because of their specific expertise. The project received funding for a three-year development process (2019–2021) from the European Union.

The process of the project is described in figure 1. The implementation of EMVITET is based on participatory action research approach (Kemmis & McTaggart, 2005) emphasizing transformation cycles, called work packages (WP) in the project, in which all participants' involvement is crucial. The aim of WP 1 Preparation was to build a common understanding between partners and sustainable ground for developing education in the Vietnamese context. During the forthcoming development cycles *WP 2.1. Establishing*, *WP 2.2. Piloting* and *WP 2.3. Ingraining*, five teacher developers from each Vietnamese institutions will learn and develop new educational practices. In each cycle or WP, Vietnamese participants are engaged in analysing their development needs in individual and community level and tailoring the forthcoming activities. The practitioners' own perspectives are highly valued and utilized following a practitioner research approach (Heikkinen, de Jong, & Vanderlinde, 2016).
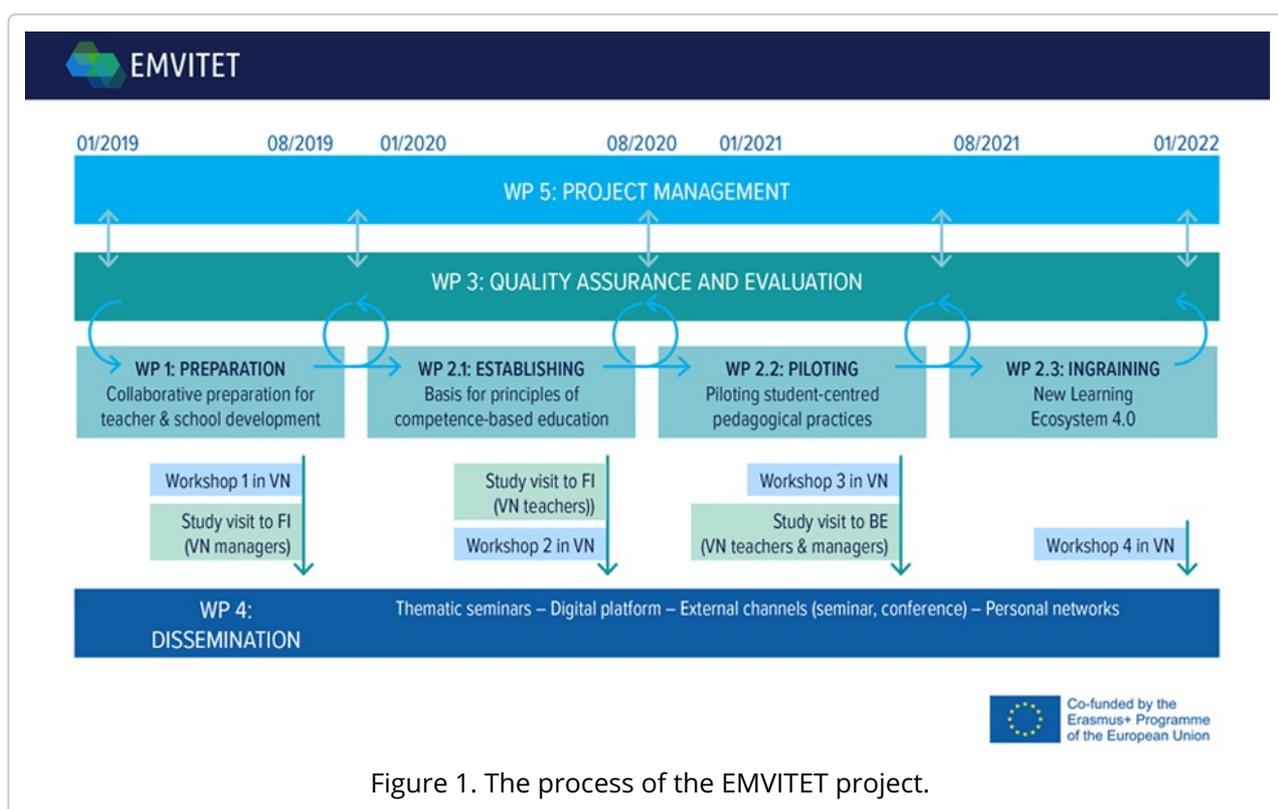
Figure 1. The process of the EMVITET project.

This article describes the outcomes of WP 1 Preparation. During WP 1, we have had many online meetings, face-to-face kick-off meeting and managers' study visit to Finland exploring Education 4.0 in practice. Furthermore, in this article we use the following data: 1) pre-questionnaires about the starting point from all Vietnamese partners, 2) collaborative analysis from kick-off meeting and 3) the managers' study visit outcomes (digitally documented in Padlet). Even though the participating educational institutions are different from each other, some general aspects can be identified in teacher, student, organizational and ecosystem level. The authors of this article have been personally involved in the activities, so their viewpoints are also utilized.

Vietnamese needs for developing Education 4.0

The project is strongly based on Vietnamese needs that align with a range of policies, strategies and resolutions with an effort to reform its education by 2020 towards Industrial Revolution 4.0. Specifically, the Fundamental and Comprehensive Reform of Higher Education in Vietnam 2006–2020 (Nam, 2013) and the National Human Resource Development 2011–2020 have been paid attention to provide lifelong learning and equip required skills (i.e., soft skills, technical skills and interpersonal skills) for all students. In addition, the Vietnamese Prime Minister issued Directive No.16/CT-TTG regarding "On strengthening the access to the Fourth Industrial Revolution" in May 2017 and requested a dramatic change in education with regards to policies, contents and methods to provide human resource adapted well with constant changes and new technology trends in Industry 4.0. To turn those ambitions on reforming education into practice, the Vietnamese government has been encouraging collaboration between educational institutions and international agencies.

The needs for an emergent change in Vietnamese education are realized in a new vocational education law taking effect on July 2015. Learners' needs to be equipped with integrated skills (i.e. working independently, being creative, and be able to apply modern technology and adapt to a new working environment) are manifested in this new law. As Ho and Tran (2018, p. 528) claim, such new skill requirements are challenging educational institutions in Vietnam and "require shifts in approaches to learning and teaching", and in particular, "the mismatch between the existing curriculum and the demands of employers must be addressed in the transformation of Vietnam into a modernised and industrialised nation". Additionally, the lack of close linkages among Vietnam's higher education institutes, the poor quality and inefficiency, outdated teaching and learning methods, as well as limited and inefficient resources for education, generally are challenging Vietnam towards the 4th industrial revolution (Do & Do, 2014). The teachers should be the changemakers in reforming the Vietnamese higher education in line with the EMVITET project supporting Vietnamese higher education institutes.

From Vietnamese partners, collected data reveals the same goals. The focus is on changing the existing curriculum towards a competence-based curriculum with student-centred education (e.g. DN-UTE) and to meet the demands of the industry (e.g. HCMUTE).

They want to change their learning and teaching cultures, enrich face-to-face learning by online learning (e.g., LHU) and focus on setting linkage with industry partners to design a model of work-based learning or learning by doing. They feel that by training teachers they can develop new teaching pedagogy, education technology and create an innovative online learning environment. Vietnamese institutions are in great need of developing their education and they feel that EMVITET project is taking its efforts to bring them into practice.

Teacher learning in the centre of developing Education 4.0

Already during the planning of the project, the importance of teacher learning in developing Education 4.0 was recognized. The analyses of WP 1 Preparation further highlighted that. Participating Vietnamese teachers and managers expressed that there is a strong need to change the mindset of teachers. It was emphasized that a growth mindset (see Dweck, 2012) instead of a fixed one seems to be important for teachers in times of change. According to the previous research related to teacher learning in the change (Kunnari, 2018), the growth mindset of teachers requires a holistic approach to students' learning, attunement to the needs of students, alignment of pedagogical practices according to the targeted competencies, flexibility to organize learning processes utilizing resources available and relying on collaboration with students and colleagues.

Participants expressed that teachers need to develop innovative learning methods, for example, with digital tools and environments and by connecting students' learning with the world of work in an inspiring way. They also identified that to get by in Education 4.0 and in a globalized environment, teachers' English skills need to be improved. In our project, we want to build learning moments for teachers where they can cultivate their creativity and English skills at the same time. International interaction can open up new perspectives for Vietnamese partners.

Based on the analyses, the new teacher competencies important in Education 4.0 were designed and divided into three main areas:

- Competence in pedagogy means that teachers are able to design and implement competence-based and student-centred learning to match the needs of Industry revolution 4.0.
- Competence in technology means that teachers are able to effectively use technology to enhance and transform teaching and learning practices towards Education 4.0.
- Competence in the learning ecosystem means that teachers are able to engage with communities within education and industry to create connections and support collaboration needed in Education 4.0.

During the forthcoming development and learning process, Vietnamese teachers will reflect their professional growth based on these competencies. The aim is to build a competence-based implementation for teacher learning by dialogical and co-creative

learning moments with aligns to Education 4.0. Digital tools and applications will be widely used and practised. The teachers need to have own experiences as a learner to be able to apply new practices in their own environment. Our process relies on sociocultural and socio-constructivist views about learning (e.g. Lave & Wenger, 1991; Salomon & Perkins, 1998; Vygotsky, 1978), and teacher learning is seen as a dynamic interplay between a teacher and their changing work environment.

Students' challenges and possibilities

In Education 4.0, students are in the centre and their inspiration for learning is crucial. The reflections from Vietnamese partners show that they are currently facing several challenges such as in:

- improving students' participation and engagement in their own learning;
- upgrading poor quality facilities;
- providing new technologies and equipment for students' learning and practising;
- utilizing online learning resources; offering a better learning environment for big study groups;
- managing with large class sizes in too hot and small classrooms;
- renovating active learning methods and strategies;
- enhancing their English proficiency,
- developing learning skills and other soft skills.

As an example, it was mentioned that: "*The spirit of self-study and creative thinking of our students is still low.*" The Vietnamese partners also mentioned that students' learning awareness is missing. In the future world of work, it is crucial to be able and to be willing to learn continuously. The importance of transferable skills and learning skills, like communication, collaboration, creativity, critical thinking and problem solving have been identified in many studies and policy papers (Ananiadou & Claro, 2009; European Commission, 2016; Trilling & Fadel, 2009; Voogt, Erstad, Dede, & Mishra, 2013; World Economic Forum, 2018). In Education 4.0, it is crucial to focus on pedagogical practices, which require students to practice these skills.

In the EMVITET project, we need to find solutions on how to inspire students to rethink their role in education. Learning is not just managing to accomplish school tasks and get degrees, learning is for individuals to cultivate relevant competencies. The biggest current and future challenge in building student engagement might be to help them to find their personal meaning in the unpredictable world (see Harari, 2017). Students need to learn to cope with constant changes and teachers are key actors facilitating life-long learning competencies.

However, Vietnamese partners already have good experiences in activating their students. For example, with good motivation policies, LHU students proactively love to take part in national and international competitions such as the annual ABU Asia-Pacific Robot Contest (ABU Robocon), IoT Hackathon, Energy-saving Shell-Eco Marathon, Digital

race or Entrepreneurship. They learn a lot from their peers and their instructors and effectively capture the development trends in the technology market. Thus, they are usually employed by prestigious companies even before their graduation. Furthermore, many institutions have already used inspiring digital tools and applications in learning. Online learning has taken its first step. However, it seems that these kinds of practices do not fully cover all study groups or all the institutions. The nature of EMVITET is to share and develop good practices further in collaboration with the partners.

The process also offers possibilities to explore some Finnish and European experiences in improving student motivation with work-related learning and activating methods. Education in Finland is based on sociocultural and socio-constructivist approach (e.g. Lave & Wenger, 1991; Salomon & Perkins, 1998; Vygotsky, 1978), which highlights students' ownership in their own learning. Learning is facilitated by social interaction and meaningful learning occurs with authentic tasks (Ruhalahti, 2019). Learning in Education 4.0 highlights common knowledge construction, innovation, open digital collaborative working and networking with different stakeholders. This kind of learning requires new, yet learnable, skills from students. To build engagement, students need to feel seen and heard. In our process, we need to listen and explore students' needs, feelings and ideas regarding the best ways to learn. New pedagogical practices can be developed *with* the students, not just *for* them (Kunnari, 2018).

Organizational learning towards Education 4.0

Koenen, Dochy and Berghmans (2015) argue that "*a competence-based institution should function as a learning organization that is constantly evolving in response to an ever-changing and increasingly complex professional practice*". Schools as learning organizations need "*reculturing, retiming and restructuring*" (Fullan, 2005). Such institutions should provide a proper learning environment to foster student creativity and innovation so that they can effectively deal with complex problems happened in their careers and daily lives (Wagner, 2010). Moreover, creativity has been identified as one of the key skills required from the 21st-century workforce and it should be considered as a critical goal for relevant stakeholders in education systems (Chan & Yuen, 2014; Robinson, 2011; Wagner, 2010). To support creativity and innovation, it is not enough to develop practices in teacher-student level, but also to focus on building organizational culture and structures.

Each Vietnamese educational institution needs to find their own next possible development step in the process. Managers play an important part in cultivating organizational learning towards Education 4.0. The aim of managers' study visit to Finland was to strengthen common understanding and engagement to support the forthcoming development process. This aim was very well reached. As outcomes of the visit, we can identify many practical actions, which build a good foundation for further development. Managers expressed the way they can build a new learning culture, like "*We need to trust and support our teachers to learn*" or "*Encourage students to join and take their role in teaching and learning process*". They mentioned the need to make a strong

linkage between educational institutions and industry by research and project-based learning and to change the curriculum to meet the requirements of companies. They recognized the need for utilizing digital tools and environments in building inspiring learning environments for teachers and students. It is crucial that managers are motivated for changes and also learning themselves, as their own enthusiasm and interest can help to overcome challenges.

Towards learning ecosystem of Education 4.0 in Vietnam

The desired change in the Vietnamese context requires new ways of operating in professional networks. In our project plan, we stated that "*Education 4.0 is based on equal cooperation, dialogue and transparency, which builds trust and common understanding between partners. The aim is to build a learning ecosystem 4.0 with communities of practice*". Based on the experiences of WP 1, we already have a strong engagement to continue the collaboration. During managers' visit in Finland, managers showed a lot of support to each other and the spirit for common development was high. They mentioned that mutual collaboration is crucial to maximizing the usage of all the available resources such as the library, research facilities and online training materials. Regarding prior knowledge and expertise of Education 4.0, institutions have their own strengths and speciality areas which can be identified and collaboratively utilized later on in the EMVITET project.

In Vietnam, Education 4.0 is seen as a smart model that links three key partners: schools, administrator and industry in order to create a responsive environment to promote creativity, innovation and productivity in a knowledge society (Vietnam News Agency, 2017). A "closed" education might be changed into an "open" one that encourages a smooth communication among schools, administrators such as school managers, and industry partners. The role of higher education is to operate as a part of ecosystems providing flexible learning paths utilizing advanced technology.

Developing learning ecosystem for Education 4.0 means that all the stakeholders such as students, teachers and industry partners need to rethink their roles and many times go out of their traditional "boxes", out of their comfort zones. In Education 4.0, students can be the ones who know the best and can teach each other. Teachers can learn together with them and be more like facilitators of the processes. Teachers can no longer restrict their work to a school environment but collaborate with the business and industry partners providing learning possibilities and innovation platforms also for them. Additionally, students can be encouraged to build their own professional connections. Industry partners need to recognize the added value of collaboration with education. All these advancements towards Education 4.0, need dialogical competencies and emotional intelligence. In our project, we will focus on cultivating these competencies in practice.

Conclusions

Rethinking learning towards Education 4.0 means that all the stakeholders need to consider them as learners. Not just teachers and students, but managers, educational institutions, business and industry need to learn new ways of building relevant competencies. Education 4.0 cannot be developed by relying on our traditional roles and structures. Learning can be most meaningful when we go out of our comfort zone and try to think differently. In the following steps, we will focus on establishing, piloting and ingraining Education 4.0 in practice.

Teachers are key actors in this process in engaging their students and industry partners to the development. It is important to notice that all the new responsibilities cannot be added to or embedded within more traditional structures and practices, but some practices and structures will need to be given up (Kunnari, 2018, p. 42). We also have to harness digital technologies for meaningful learning. However, in the time of change, we need to invest as much in humanity as we invest in technology (Leonhard, 2017). Keeping this in our mind, we can build sustainable, inspiring and relevant Education 4.0.

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