

## **Methodological Background of the project**

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### **Gender aspects of digital readiness and development of human capital in regions (2019 – 2020)**

#### ***1. The reasoning.***

Taking into consideration that direct usage of methodologies in different cultural contexts do not supply with valid conclusions; also social institutes with their historically developed cultural experiences and values as a background on which they develop, are significant factors in the prosperity of some regions, people well-being and emotional balance. Values, convictions and stereotypes of the inhabitants form their subconscious "thinking algorithms" (Hofstede & Hofstede, 1991), participate in their decision-making and activities in manyfaceted social spheres and activities, including economy and education. The traditional notions of the "male" and "female" professions and differences in their abilities and skills affect the education, career choice, decisions, these further impact the quality and structure of human capital of a region.

The investigation takes into consideration that the regions where the research is located – Ternopil oblast of Ukraine and Latgale region in Latvia - have many common socio-economic problems: the post-Soviet experiencies, the outflow of the able-bodied population abroad due to the jobs shortage, income usually below the average national one, lack of investment resources for economic development; all these are causally linked with human capital development.

For the transitive economies the IT sector has special importance, as a non-capitalist catalyst for structural changes aimed to increase the added value share (Roztocki & Weistroffer, 2008). However, even having developed infrastructure, the challenge for digital transformation may be in the lack of "digital readiness" – the people's ability to actively and purposefully use technologies for addressing personal, business and social problems (Horrigan, 2016). The poorly prepared population to live and work in a considerably changed situation after 1991 find themselves poorly adopted to the new economy and social environment. Besides, capitalist way of living, production and marketing also demonstarte contradictions with even deeper differences between the rich and the poors, men and women empyoment in the spheres where people feel unprepared.

The greatest role in the formation of digital readiness belongs to education. Although in Ukraine and in Latvia, the percentage of females obtaining post-secondary education, is higher than that of males, only one-fifth of women work in high-tech industries in Ukraine, and in Latvia about one third (Gender Equality Index, 2017). A number of researchers (Fraser-Thoms, 2014, Gorski, 2009) believe that unequal gender attitudes get discursively reproduced and institutionalized in educational institutions, and that affects the unreasonably modest representation of women in the IT; the tendency will only increase.

Among the educators of both countries, females largely predominate. The pre-conducted, Ukrainian-Canadian study (Mikhailenko, 2016) revealed the average-and-low level of digital competencies in the surveyed group of university teachers in Ukraine, which consisted mostly of women (Blayone et al., 2017).

To follow the aimed of the project to reduce this problem and tackle the research questions on the digital readiness of students and professors, there gender disparity, as well as possible risks in the formation of human capital, the following theoretical background has been adopted.

## 2. Theoretical background of the research.

The researchers of this project hypothesize, that the transformative learning for teachers' and educators' professional development (doctoral programs etc.) should focus on digital, collaborative-constructivist model, which improves digital skills, boosts internal motivation for learning (Akyol and Garrison, 2014; Desjardins, 2008) and changes the attitudes toward democratized, socially- and inquiry-engaged teaching and learning (Blayone et.al, 2017; Garrison, 2016). A constructivist environment creates around an authentic and open-ended problem with no predefined "right" answer, which provides a motivational context for learning and allows for social negotiation; so students can test their understandings against others.

The idea of transformative learning shifts the educational paradigm, as it means not a defined destination, but an ongoing, emancipatory, development process on the background of activities, "the expansion of consciousness through the transformation of basic worldview and specific capacities of the self" (Elias et.al, 1997). So, within this model, learners move through an ongoing process of changes, establishing intermediate contextual learning goals and rethinking them once they are achieved (Mikhailenko et al, 2019). The conception of action-based human development traces back to the action theories and communication in a cultural social environment:

- Vigotsky's (1978) and Leoniev's (1978) theories with the accent on *human development in educational action* (practical, mental, social; formal, informal or non-formal);
- *individuals, as active agents*, are brought together with other agents and the *cultural-social environment*.
- Therefore Four sub-systems of *digitally mediated action* (Blayone, 2018):
  - (a) relating to building and maintaining *human-machine pairings* - meta-functional, technical and operational;
  - (b) *mediating cultural expression* address internalization and externalization largely determined by rules and values of participating communities;
  - (c) *automatization of actions* by reducing them to formal procedures (algorithms) run by a machine;
  - (d) the most complex sub-system addresses *digitally-mediated collaboration*.

The Fully Online Learning Community (FOLC) (Blayone et.al, 2017), developed in the EILAB, University of Ontario Institute of Technology (UOIT), Canada, can be sampled as a model with the described characteristics. FOLC was conceived as an offshoot of the Community of Inquiry (CoI) model (Garrison, 2007), but evolved conceptually as a digitally enabled learning processes that are adaptable to the socio-cultural context of institutions and learners, which is important for using it internationally, like in this project. The later development of FOLC embraced a deeper relinquish of teacher's/educators' control, greater socio-emotional interaction and the advanced use of social media for community-building (Blayone, 2019).

Mezirow (1997), the founder of transformative learning theory, emphasizes that adult learning in contemporary society means making own interpretations rather than acts of beliefs, judgements, and feelings of others. He suggests, that learning goals should be considered in short- and long-term perspectives with the focus on learners' abilities and competence. The learner's immediate objectives may be described as obtaining specific, job-related competencies, but the life-term goal is to become a socially responsible, autonomous thinker.

However, most of the studies which focus on digital competencies and learning fall into technological determinism, leaving the socio-cultural context beyond attention (Blayone, 2018).

The transformative learning theory is chosen for this investigation for the three dimensions of "perspective transformation":

- psychological (changes in understanding of the self),

- convictional (revision of belief systems), and
- behavioral (changes in lifestyle) (Mezirow, 1991).

So, we should consider these dimensions in addition to the digital skills when talking about the transformative digital learning. Taken together, they describe the context, or the “zone of proximal development” - the area of learning that occurs when a person is assisted by a teacher or peer with a higher skill set (Vygotski, 1978). The activity theory (Engeström, 2000; Kaptelinin, 2017) allows to define a context as a holistic complex. That’s why the Activity System model can be used for modeling the transition from the existing to the desired state of a learning process.

The items—human agent, object, tools/instruments, community, division of labour and rules — are introduced as the constituent elements (and mediators) of human’s activity. These also are in compliance with a pedagogical process or any other assisted learning, be it digital or traditional one:

- Subject – the activity participant, with his/her positioning and identity, knowledge and abilities, attitudes and value orientations in a socio-cultural environment; the digital skills of men and women in positions of activity subjects will be identified.
- Object – the entity and/or an ideal goal, which motivates and organizes the subjects’ interaction and is transformed in processes of particular actions.
- Outcome – desired state of the object, which expected to be achieved as a result of activity; we distinguish between the academic or technical outcomes and the Subject’s individual achievements in their development, including their digital competencies which are to be improved due to the transformative character of activities.
- Community and labour division – all the more or less involved activity team members, communication, coordination of activities and efforts, synergy and mutual relations.
- Tools – artefacts and instruments, which are used to achieve the desired transformation of the object, add to the activities those qualities which provide the Subject opportunities to achieve and develop his/her individual qualities.
- Rules - explicit and implicit ways for coordinating and mediating relations between the community members themselves, between them and the objects, as well as between actors of the socio-cultural environment.

Having the model for the desired digital learning transformations, we should explore the factors, potentially influencing this process and evolving with it. As mentioned above, we mean: digital competencies and psychological (self-identity), convictional (the own values), and behavioral (lifestyle) factors. In our projects, will measure the appearance of these factors at students and professors of Rezekne Technological Academy (Latvia) and Ternopil National Economic University (Ukraine), respectfully using the online questionnaires which will be translated to Latvian and Ukrainian.

### ***3. The tools of gathering data (attached):***

- Digital Competency Profiler (DCP) (EILAB, 2017)
- Personal Cultural Orientation (PCO) (Sharma, 2009)
- Cultural Values Scale (CVScale) (Sharma, 2009)
- Attitudes toward IT (AttIT) (Gokhale, 2013).

The data will be analyzed with the Statistical Package for Social Sciences (SPSS) to define the cross-correlation, the significance of mutual influence, and do the comparisons in gender and national perspectives.

The methodology will be presented and discussed at two international conferences of Rezekne technological academy in 2019.

#### 4. The literature used to base the rationnaile and the theoretical background of the research:

- Akyol, Z. & Garrison, D. R. "The development of a community of inquiry over time in an online course: Understanding the progression and integration of social, cognitive and teaching presence," *Journal of Asynchronous Learning Networks*, vol. 12, no. 3-4, pp. 3-22, 2014.
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- Blayone, T. "Deepening democratized digital learning," 2019.
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- Roztocki, N & Weistroffer, H. R. "Information and communication technology in transition economies: An assessment of research trends," *Information Technology for Development*, vol. 21, no. 3, pp. 330-364, 2015.
- Sharma, P. "Measuring personal cultural orientations: Scale development and validation," *Journal of the Academy of Marketing Science*, vol. 38, no. 6, pp. 787-806, 2009.
- Vygotsky, L. *Mind in society: Development of higher psychological processes*. Cambridge, MA: Harvard University Press, 1978.

#### 5. Attachment – tools for data gathering:

##### 1.Cultural Values Scale (CVScale)

- Yoo, B., Donthu, N., & Lenartowicz, T. (2011). Measuring Hofstede's five dimensions of cultural values at the individual level: Development and validation of CVSCALE. *Journal of International Consumer Marketing*, 23(3-4), 193-210. doi:10.1080/08961530.2011.578059

##### Power Distance (PD)

- PD1 People in higher positions should make most decisions without consulting people in lower positions.
- PD2 People in higher positions should not ask the opinions of people in lower positions too frequently.
- PD3 People in higher positions should avoid social interaction with people in lower positions.
- PD4 People in lower positions should not disagree with decisions by people in higher positions.
- PD5 People in higher positions should not delegate important tasks to people in lower positions.

### **Uncertainty Avoidance (UA)**

- UA1 It is important to have instructions spelled out in detail so that I always know what I'm expected to do.
- UA2 It is important to closely follow instructions and procedures.
- UA3 Rules and regulations are important because they inform me of what is expected of me.
- UA4 Standardized work procedures are helpful.
- UA5 Instructions for operations are important.

### **Collectivism (CO)**

- CO1 Individuals should sacrifice self-interest for the group (either at school or the work place).
- CO2 Individuals should stick with the group even through difficulties.
- CO3 Group welfare is more important than individual rewards.
- CO4 Group success is more important than individual success.
- CO5 Individuals should only pursue their goals after considering the welfare of the group.
- CO6 Group loyalty should be encouraged even if individual goals suffer.

### **Masculinity (MA)**

- MA1 It is more important for men to have a professional career than it is for women.
- MA2 Men usually solve problems with logical analysis; women usually solve problems with intuition.
- MA3 Solving difficult problems usually requires an active, forcible approach, which is typical of men.
- MA4 There are some jobs that a man can always do better than a woman.

### **Long-Short Term Orientation (LTO)**

- LTO1 Careful management of money (Thrift).
- LTO2 Going on resolutely in spite of opposition (Persistence).
- LTO3 Personal steadiness and stability.
- LTO4 Long-term planning.
- LTO5 Giving up today's fun for success in the future.
- LTO6 Working hard for success in the future.

**Answers:** Strongly disagree; Disagree; Somewhat disagree; Neither agree or disagree; Somewhat agree;

Agree; Strongly agree

## 2. PERSONAL CULTURAL ORIENTATION

Sharma, P. (2009). Measuring personal cultural orientations: Scale development and validation. *Journal of the Academy of Marketing Science*, 38(6), 787-806. doi:10.1007/s11747-009-0184-7

### **Independence (IND)**

IND 1 I would rather depend on myself than others

IND 2 My personal identity, independent of others, is important to me

IND 3 I rely on myself most of the time, rarely on others

IND 4 It is important that I do my job better than others

IND 5 I enjoy being unique and different from others in many respects

### **Interdependence (INT)**

INT 1 The well-being of my group members is important for me

INT 2 I feel good when I cooperate with my group members

INT 3 It is my duty to take care of my family members, whatever it takes

INT 4 Family members should stick together, even if they do not agree

INT 5 I enjoy spending time with my group members

### **Power (POW)**

POW 1 I easily conform to the wishes of someone in a higher position than mine

POW 2 It is difficult for me to refuse a request if someone senior asks me

POW 3 I tend to follow orders without asking any questions.

POW 4 I find it hard to disagree with authority figures.

### **Social Inequality (IEQ)**

IEQ 1 A person's social status reflects his or her place in the society

IEQ 2 It is important for everyone to know their rightful place in the society

IEQ 3 It is difficult to interact with people from different social status than mine

IEQ 4 Unequal treatment for different people is an acceptable way of life for me

### **Risk Aversion (RSK)**

RSK 1 I tend to avoid talking to strangers

RSK 2 I prefer a routine way of life to an unpredictable one full of change

RSK 3 I would not describe myself as a risk-taker

RSK 4 I do not like taking too many chances to avoid making a mistake

RSK 5 I am very cautious about how I spend my money

### **Ambiguity Intolerance (AMB)**

AMB 1 I find it difficult to function without clear directions and instructions

AMB 2 I prefer specific instructions to broad guidelines

AMB 3 I tend to get anxious easily when I don't know an outcome

AMB 4. I feel stressful when I cannot predict consequences

AMB 5 I feel safe when I am in my familiar surroundings

### **Masculinity (MAS)**

MAS 1 Women are generally more caring than men

MAS 2 Men are generally physically stronger than women

MAS 3 Men are generally more ambitious than women

MAS 4 Women are generally more modest than men

MAS 5 Men are generally more logical than women

### **Gender Equality (GEQ)**

GEQ 1 It is ok for men to be emotional sometimes

GEQ 2 Men do not have to be the sole bread winner in a family

GEQ 3 Men can be as caring as women

GEQ 4 Women can be as ambitious as men

### **Tradition (TRD)**

TRD 1 I am proud of my culture

TRD 2 Respect for tradition is important for me

TRD 3 I value a strong link to my past

TRD 4 Traditional values are important for me

TRD 5 I care a lot about my family history

### **Prudence (PRU)**

PRU 1 I believe in planning for the long term

PRU 2 I work hard for success in the future

PRU 3 I am willing to give up today's fun for success in the future

PRU 4 I do not give up easily even if I do not succeed on my first attempt

PRU 5 I plan everything carefully

**Answers:** Strongly disagree; Disagree; Somewhat disagree; Neither agree or disagree; Somewhat agree; Agree; Strongly agree

### 3. Digital Competences

Notes.

DigComp levels - EC project uses:

No or Low skills (1 item from the cluster);

Basic skills/user (two items of the cluster);

Independent user;

Proficient user

#### 1. *Information and data literacy*

##### 1.1 *Browsing, searching and filtering data, information and digital content:*

To articulate information needs, to search for data, information and content in digital environments, to access them and to navigate between them. To create and update personal search strategies.

##### 1.2 *Evaluating data, information and digital content:*

To analyse, compare and critically evaluate the credibility and reliability of sources of data, information and digital content. To analyse, interpret and critically evaluate the data, information and digital content.

##### 1.3 *Managing data, information and digital content:*

To organise, store and retrieve data, information and content in digital environments. To organise and process them in a structured environment.

#### 2. *Communication and collaboration*

##### 2.1 *Interacting through digital technologies:*

To interact through a variety of digital technologies and to understand appropriate digital communication means for a given context.

##### 2.2 *Sharing through digital technologies:*

To share data, information and digital content with others through appropriate digital technologies. To act as an intermediary, to know about referencing and attribution practices.

##### 2.3 *Engaging in citizenship through digital technologies:*

To participate in society through the use of public and private digital services.

To seek opportunities for self-empowerment and for participatory citizenship through appropriate digital technologies.

##### 2.4 *Collaborating through digital technologies:*

To use digital tools and technologies for collaborative processes, and for co-construction and co-creation of resources and knowledge.

##### 2.5 *Netiquette:*

To be aware of behavioural norms and know-how while using digital technologies and interacting in digital environments. To adapt communication strategies to the specific audience and to be aware of cultural and generational diversity in digital environments.

##### 2.6 *Managing digital identity:*

To create and manage one or multiple digital identities, to be able to protect one's own reputation, to deal with the data that one produces through several digital tools, environments and services.

#### 3. *Digital content creation*

##### 3.1 *Developing digital content:*

To create and edit digital content in different formats, to express oneself through digital means.

##### 3.2 *Integrating and re-elaborating digital content:*

To modify, refine, improve and integrate information and content into an existing body of knowledge to create new, original and relevant content and knowledge.

##### 3.3 *Copyright and licences:*

To understand how copyright and licences apply to data, information and digital content.

##### 3.4 *Programming:*

To plan and develop a sequence of understandable instructions for a computing system to solve a given problem or perform a specific task.

#### 4. *Safety*

#### 4.1 *Protecting devices:*

To protect devices and digital content, and to understand risks and threats in digital environments. To know about safety and security measures and to have due regard to reliability and privacy.

#### 4.2 *Protecting personal data and privacy:*

To protect personal data and privacy in digital environments.

To understand how to use and share personally identifiable information while being able to protect oneself and others from damages.

To understand that digital services use a "Privacy policy" to inform how personal data is used.

#### 4.3 *Protecting health and well-being:*

To be able to avoid health-risks and threats to physical and psychological well-being while using digital technologies.

To be able to protect oneself and others from possible dangers in digital environments (e.g. cyber bullying).

To be aware of digital technologies for social wellbeing and social inclusion.

#### 4.4 *Protecting the environment:*

To be aware of the environmental impact of digital technologies and their use.

### 5. *Problem solving*

#### 5.1 *Solving technical problems:*

To identify technical problems when operating devices and using digital environments, and to solve them (from trouble-shooting to solving more complex problems).

#### 5.2 *Identifying needs and technological responses:*

To assess needs and to identify, evaluate, select and use digital tools and possible technological responses to solve them.

To adjust and customise digital environments to personal needs (e.g. accessibility).

#### 5.3 *Creatively using digital technologies:*

To use digital tools and technologies to create knowledge and to innovate processes and products. To engage individually and collectively in cognitive processing to understand and resolve conceptual problems and problem situations in digital environments.

#### 5.4 *Identifying digital competence gaps:*

To understand where one's own digital competence needs to be improved or updated.

To be able to support others with their digital competence development.

To seek opportunities for self-development and to keep up-to-date with the digital evolution.

## 6. ATTIEKSME PRET INFORMĀCIJAS TEHNOLOĢIJĀM

Informācijas tehnoloģijas (IT) ir kļuvušas par neatņemamu dzīves sastāvdaļu. Tās attiecas uz visu, kas skar datoru tehnoloģijas, piemēram, tīklošanu, datoraparāturu, programmatūru, tīmekļa izstrādi, internetu, īpaši uz cilvēkiem, kas strādā ar šīm tehnoloģijām.

Šī aptauja sniegs noderīgu informāciju un rosinās padomāt par to, kā sabiedrībā tiek uztvertas informācijas tehnoloģijas (IT). Lūgums atbildēt pēc iespējas godīgāk. Nepastāv pareizas un nepareizas atbildes. Visatbilstošākā ir tā atbilde, kura Jums šķiet pareiza.

Katram no zemāk tabulā minētajiem apgalvojumiem izvēlieties un atzīmējiet piemērotāko atbildi

Apgalvojums	Pilnībā nepiekrītu	Nepiekrītu	Neitrāla attieksme	Piekrītu	Pilnībā piekrītu
1. Informācijas tehnoloģijas (IT) padara mūsu dzīvi veselīgāku, vieglāku un ērtāku	1	2	3	4	5
2. Vīriešiem piemīt vairāk dabisko spēju darbam ar informācijas tehnoloģijām (IT), nekā sievietēm	1	2	3	4	5
3. Kopumā informācijas tehnoloģijas (IT) radīs vairāk darbavietu salīdzinājumā ar tām, kas zudīs to dēļ	1	2	3	4	5
4. Manā ikdienā man ir svarīgi zināt par IT	1	2	3	4	5



5. Gan sievietēm, gan vīriešiem ir vienlīdzīgas iespējas kļūt veiksmīgiem IT jomā	1	2	3	4	5
6. IT pārāk ātri maina mūsu dzīvesveidu	1	2	3	4	5
7. IT dēļ darbs kļūs pievilcīgāks	1	2	3	4	5
8. Ģimenei draudzīga vide ir pieejamāka amatos, kuri ir saistīti ar IT.	1	2	3	4	5
9. Sasniegumi IT jomā galu galā iznīcinās Zemi	1	2	3	4	5
10. IT kursi ir nozīmīgs ieguldījums sevis izglītošanā	1	2	3	4	5
11. Gan sievietēm, gan vīriešiem ir vienlīdzīgas iespējas attīstīt IT spējas	1	2	3	4	5
12. IT dēļ nākamajām paaudzēm būs vairāk iespēju	1	2	3	4	5
13. IT pētījumi ir devuši vairāk ieguvumu, nekā zaudējumu	1	2	3	4	5
14. Sievietēm piedien veidot karjeru IT jomā	1	2	3	4	5
15. Cilvēkiem kļātos labāk, ja viņi izvēlētos vienkāršāku dzīvi bez tik plašas IT izmantošanas	1	2	3	4	5
16. IT lietojumprogrammas padara dzīvošanu mākslīgu un necilvēcīgu	1	2	3	4	5
17. Darba vide IT jomā sievietēm ir tāda pati, kā vīriešiem	1	2	3	4	5
18. IT pētnieki vēlas strādāt ar lietām, kas padarītu vidusmēra cilvēka dzīvi vieglāku	1	2	3	4	5
19. Sievietes būtu jāaizsargā veidojot karjeru IT jomā	1	2	3	4	5
20. IT jomā vadošie amati būtu jāņem vīriešiem, nevis sievietēm	1	2	3	4	5
21. Jauni izgudrojumi vienmēr pasargās no kaitīgajām IT sekām	1	2	3	4	5
22. Valdībai būtu jāatbalsta pētījumi IT jomā, pat ja tie neuzrādīs tūlītējus ieguvumus	1	2	3	4	5
23. Man patīk uzzināt par jauniem atklājumiem IT jomā	1	2	3	4	5
24. Esmu labi informēts/-ta par jauniem atklājumiem IT jomā	1	2	3	4	5
25. Mani interesē jaunākās IT lietojumprogrammas, kas varētu uzlabot mūsu dzīvi	1	2	3	4	5
26. Man patīk lasīt informāciju, kas ir saistīta ar IT	1	2	3	4	5
27. Man patīk skatīties filmas un video, kas saistīti ar IT	1	2	3	4	5
28. Esmu internetā meklējis/-jusi informāciju par IT attīstību	1	2	3	4	5
29. Internetam būtu jābūt pietiekami plašam, lai tas būtu pieejams visur uz planētas, neatkarīgi no izmaksām	1	2	3	4	5
31. Jūsu dzimums:	Sieviete		Vīrietis		