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# FUNFORLAB INTERREG-EMR: SWOT REPORT

written by the FUNFORLAB consortium:



March 2022

# FUNFORLAB INTERREG-EMR: SWOT REPORT

*written by the FUNFORLAB consortium for WP1 (November 2021 – March 2022)  
of the FUNFORLAB project*

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FÉDÉRATION  
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## 1. Introduction

The FUNFORLAB (FFL) project, and its consortium of educational and IT partners across the Meuse-Rhine Euregio (EMR), is kindly funded by INTERREG-EMR and has the following goals during its 3-year project window:

- To promote the profession of medical laboratory technologist (MLT)
- To improve and homogenize the training and education MLT students in university colleges and related educational programs across the EMR
- To improve MLT cross-border mobility in the EMR and thereby tackling labor shortages in specific EMR countries.

In order to achieve the aforementioned goals, the primary aim of the FFL consortium is to develop an innovative, game-based learning tool. This 'FFL game' will be primarily developed for: i) secondary school pupils following technical/science courses or with general interest in science, ii) MLT students in higher education (e.g. university college) and their respective teachers and iii) individuals across the EMR currently not in employment, education or training (NEETS). In addition, health professionals will be a target group that will potentially be reached at the end of the project. During WP1 (June 2021 – March 2022), the FFL consortium comprised following EMR-based partners and project members:

- **Dutch Region**
  - *Applied Science, Zuyd Hogeschool (Zuyd)*
    - Olivier Segers
    - Ron Reuleaux
    - Olaf Brouwers
    - Jeroen Heijdemann
    - Marliene Bos
- **Flemish Region**
  - *Medische Laboratoriumtechnologie, UC Limburg-Leuven (UCLL)*
    - Eveline Strackx
    - Karolien Decamps
    - Evi Lemmens
    - Laura de Bock
    - Evelyn Jans

- **German Region**

- *Ausbildungsakademie für Gesundheitsberufe, Uniklinik RWTH Aachen (RWTH)*

- Eva Schönen

- Giannina Lindt

- Christiane Stickelmann

- Silvia Schneiders

- Patricia Bütz

- Monika Krichel-Frings

- **Walloon region**

- Centre de recherche des instituts groupés de la Haute Ecole Libre Mosane (CRIG-HELMo)

- Isabelle Bragard

- Birgit Quinting

- Annabelle Lejeune

- Ingrid Hamer

- Sacha Munaut

- Sonia El Guendi

- Centre de recherche et de formation continue de la Haute Ecole Namur Liège Luxembourg (FoRs)

- Julien Lecointre

- Laura Ramonfosse

- Simon Daniau

- Centre de Coopération technique et pédagogique, centre de recherche associé à la Haute Ecole de la Province de Liège (CecoTePe)

- Kotnic Frédéric

- Stéphanie Vandervost

- Aurélien Bolkaerts

- (Guillaume Vilvorder)

For secondary school pupils, the FFL game aims to contribute to career orientation and attracting them to the MLT profession. To clarify, a significant challenge in the EMR remains to provide secondary school pupils with a realistic career perspective in order for them to make the right educational choices. After graduating secondary school, a significant amount of pupils is disoriented and unsure what profession they want to pursue. These pupils will have a higher chance to drop out of university college (or university) programs, lose interest in education or, worst-case, leave the educational system without a higher degree. The FUNFORLAB project wants to tackle this issue by improving the orientation of (technically-educated) secondary school pupils and simultaneously promote the profession of MLT. This will be primarily done by developing an 'FLL game', which will be embedded

as a pedagogical tool in respective science courses (e.g. biology, chemistry, ...). By promoting MLT profession, the FUNFORLAB consortium not only aims to improve career orientation, but also to increase the influx of students in MLT educational programs at EMR-based university colleges. Given that some of these programs currently have a shortage of students to meet labor demand, the FFL game additionally aims to contribute to the ongoing and increasing demand for MLT professionals, especially during the current health crisis.

In higher education, the first year of MLT training results in a relatively high dropout rate, regardless of country of origin. As already mentioned, a certain percentage of these dropouts can be attributed to a wrong educational choice when graduating from secondary school. In addition, there is also: i) a growing gap between educational reality (what do you learn as a MLT student) and professional reality (what do you do as a MLT professional), and ii) a lack of awareness what the career expectations are for students pursuing an MLT degree. Also here, the FFL game will make it possible to act on these challenges. By developing the FFL game in such a way that students will be exposed to day-to-day realities and challenges that MLT professionals encounter, the game will provide MLT students with an improved career perspective and address specific skills and knowledge which are currently not present in MLT programs. Specifically, there is a need to adapt the technical skills of MLTs students to the increasing automation of their trade. All EMR-based university colleges are generally equipped with laboratories for teaching manual medical techniques. However, a considerable amount of these methods have become fully automated in professional MLT laboratories, and schools are unable to equip themselves with these so-called 'automatons'. The FFL game will allow MLT student to encounter these 'automatons' and their mode of operation in a virtual/digital environment, hereby closing the gap between educational and professional reality.

In order to successfully develop and disseminate the FFL game, the consortium partners will actively involve three target groups in the development of the FFL game: i) secondary school teachers and students; ii) school drop-outs and iii) MLT students and teachers. In order to achieve the FFL project objectives and to tailor the FFL game specifically to the needs of these target groups, a SWOT analysis has been carried out. The results of this SWOT analysis have been summarized in this report and address the different challenges of the EMR region with respect to MLT education and profession and also feeds the FFL consortium with essential information for the development of the FFL game. Eventually, a prototype of the game will be developed in WP2 of the FFL project, taking into account the results of this SWOT report. This prototype will be shared, tested and evaluated by the specific target groups in WP3 and WP4.

## 2. FFL SWOT methodology

A SWOT analysis was performed for the following EMR regions and all consortium partners of the FFL project were involved (**see chapter 1**). The SWOT analysis provided insights into the current situation of MLT education and profession in the EMR, but also essential input for developing two specific FFL game types: i) a FFL game which will have a point-and-click 3D game design and ii) a FFL game which will have a VR game design.

Data to perform the SWOT analysis was obtained by collecting information from all target groups. To efficiently gather input from these target groups (secondary school teachers and students, MLT students and teachers, college drop outs and MLT professionals), a hybrid (= both physical and online) SWOT event was organized by all FFL partners on the 23<sup>rd</sup> of November 2021. The target groups of the SWOT event were approached and invited by the FFL partners who set-up an advertisement campaign. Specifically, promotional videos and invitation were made and disseminated using social media, personal contact (mail and phone) and the FFL website in the months leading up to the 23<sup>rd</sup> of November 2021. Because of the COVID situation and the accompanying restrictions, organisation of the SWOT event and participation of target groups was challenging. Nonetheless, the FFL partners took an important first step in building an FFL community.

During this SWOT event at the Brightlands Chemelot Campus (Dutch region), all target groups could participate both online or physically. The invitation to the event, program of the event and a link to promotional videos can be found in **appendix I**. During the SWOT event, all target groups were asked to provide personal input on prepared provocative statements dealing with MLT during hybrid SWOT sessions. These SWOT sessions were arranged per language region (Dutch, Flemish, German, Walloon (French and German)). During the SWOT sessions, an online KAHOOT session was constructed by the consortium partners via which specific statements could be presented to both online and physical participants. The statements were divided into two parts focusing on a) MLT education and profession and b) the FFL game. Below you can observe the statements presented during the SWOT sessions:

### ***Session A: MLT education and profession***

#### *1. Student ideas on MLT in secondary schools and university colleges*

*Statement 1: The education program to become an MLT professional is too complex and demanding.*

*Statement 2: Working as an MLT professional is boring, repetitive and even dangerous work.*

*Statement 3: Students get a good (re)presentation in their classes what it means to become and be an MLT professional*

## 2. MLT education at the moment

*Statement 1: At the moment, a student is technically well prepared for his first internship in a medical laboratory.*

*Statement 2: No amount of training can really prepare you for the real life work situation BUT the skills needed to be flexible and adaptable; those are crucial.*

## 3. MLT profession

*Statement 1: It does not matter if an MLT professional got his education in Belgium, the Netherlands or Germany. It is the same job and the MLT professional should be able to work in the whole EMR region without restrictions.*

*Statement 2: The MLT profession is just not attractive enough. Salary is relatively low and there is too little flexibility to make the job appealing.*

*Statement 3: There are plenty of options for an MLT professional to develop further skills/knowledge as an MLT professional.*

## Session B: the FUNFORLAB game

### 1. Content of the game

*Statement 1: A FUNFORLAB serious game can help institutions improve their MLT program*

*Statement 2: The content of the game should focus solely on acquiring detailed skills/knowledge on a specific automaton.*

*Statement 3: A serious game for MLTers should focus solely on the workings of a diagnostic lab or a specific automaton/equipment. Creating a world in which the gamer also gets a general idea on the workings of a hospital is not necessary.*

### 2. Format of the game

*Statement 1: The format and visuals of the FUNFORLAB game (2D, 3D, VR, ...) are not important for the success of the game. It is all about content.*

*Statement 2: A competitive aspect can improve the attractiveness and success of the FUNFORLAB game.*

*Statement 3: The game should have a problem-based set-up instead of an instructive set-up. Gamers should encounter challenges instead of just being instructed how to operate something.*

### 3. Implementation of game

*Statement 1: The FUNFORLAB game should only be available via download on the FUNFORLAB website*

### 4. Sustainable Community of game

*Statement 1: The FUNFORLAB game should contain different difficulty levels and chances to re-play*

The participants of the hybrid FFL SWOT event were able to individually vote on the statements (agree/disagree/neutral) and could provide narrative or oral input to argument their voting behavior. This data was eventually gathered and analyzed by all partners, separately for each language region. This eventually resulted in a general overview of the voting and SWOT results for



each of the language regions (**see appendix II**). From all the analyzed SWOT data, ultimately two SWOT matrices were constructed which summarize the shared input for the entire EMR and its respective partners (**see chapter 3, figures 1 and 2**). These SWOT matrices depict the strengths, weaknesses, opportunities and threats that are common for all partners. All data in these SWOT matrices is, in essence, essential and equally important for all regions. During the development of the FLL game, the consortium partner will have to decide which input has higher priority. Besides common results, each language region also had region-specific input which was not shared by other EMR partners (**see chapter 4**).

Because of the ongoing COVID-related health-crisis, not all target groups (or a minimal capacity) could attend the FFL SWOT event. For that reason, each partner also attempted to contact specific target groups parallel to the SWOT event in order to gather further input. For these activities, the consortium partners constructed specific questionnaires in all EMR languages which were shared with the target groups digitally or in personal meetings/contacts (see appendix III for an example of such a questionnaire). Importantly, the SWOT results which are presented in this report are based on the data obtained solely from the SWOT event (**see chapter 3**).

### 3. FFL SWOT results: general outcome for EMR region

This chapter summarizes the SWOT results which were obtained by all consortium partners from the SWOT event. Specifically, results in this chapter are common, equally important for all consortium partners and thus applicable for the entire EMR. All results are summarized using two SWOT matrices. One SWOT matrix provides strengths, weaknesses, opportunities and threats with respect to MLT education and profession (**see figure 1**) and the other SWOT matrix provides this information for the FLL game (**see figure 2**). These SWOT matrices provide essential input for the consortium partners in order to achieve the FLL project goals. The results were obtained from all target groups, except for the NEETS who were not reached by any of the FFL partners (not included in table). The amount of students, teachers and professionals that provided their input are depicted in **table 1**. The results in the SWOT matrixes (figure 1 and figure 2) are only based on the input gathered from the participants of the SWOT event and did not include input from participants outside the SWOT event. These activities outside the SWOT event were mainly used to create a network and build the FFL community.

Table 1. Overview of participants that provided input for SWOT analysis (based on FFL indicator data of 24-02-22)

No. of participants (SWOT sessions – SWOT event)					
	<i>Secondary school students</i>	<i>Secondary school teachers</i>	<i>MLT students</i>	<i>MLT teachers</i>	<i>MLT professionals</i>
Dutch region	0	0	12	2	2
Flemish region	0	0	4	6	0
German region	0	0	23	0	2
Walloon region	0	0	118	6	1
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>157</b>	<b>14</b>	<b>5</b>
No. of participants outside SWOT event (questionnaire/regional meetings/...)					
	<i>Secondary school students</i>	<i>Secondary school teachers</i>	<i>MLT students</i>	<i>MLT teachers</i>	<i>MLT professionals</i>
Dutch region	54	1	20	1	0
Flemish region	0	2	20	18	5
German region	114	0	0	3	45
Walloon region	16	6	0	0	0

<b>TOTAL</b>	<b>184</b>	<b>9</b>	<b>40</b>	<b>22</b>	<b>50</b>
<b>TOTAL PARTICIPANTS</b>	<b>184</b>	<b>9</b>	<b>197</b>	<b>36</b>	<b>55</b>

If an overview is created from the participants to the SWOT event, it can be observed that attendees from following institutions (n=total number per country) across the EMR were present:

#### ***Belgium (n= 7)***

- Belgische Vereniging van Laboratoriumtechnologen (BVL-ABTL)
- CECOTEPE (FFL partner)
- HELMO-CRIG (FFL partner)
- Haute Ecole de la Province de Liège (HEPL)
- Haute Ecole Charlemagne (HECH)
- HENNALUX FORS (FFL partner)
- UCLL (FFL partner)

#### ***Germany (n= 2)***

- UK Aachen (FFL partner)
- Medi-Lab

#### ***The Netherlands (n= 2)***

- Zuyd University of Applied Sciences (FFL partner)
- Maastricht University Medical Centre

The results which are depicted in **figure 1 and 2** represent the SWOT matrices for MLT education, mobility and profession across the EMR region and the FFL game. All strengths, weaknesses, opportunities and threats which are presented in these matrices were found to be common for all EMR regions based on the voting of all target groups during the SWOT sessions and all narrative argumentation/input provided during these SWOT sessions. In essence, this means that all results in these SWOT matrices are of equal importance to all FFL partners. The FFL partners will have to take all internal and external variables into account and decide, for the remainder of the project, which input they want to give more or less priority in e.g. development of the FFL game.

When looking at the results for MLT education, mobility and profession (**figure 1**), it can be observed that both in secondary schools and university colleges, the information pupils and students receive on MLT education is almost absent and, if present, unspecific (= it does not really provide a realistic view on MLT profession). The FFL game and its community could really provide a solution to this problem by focusing on better and more realistic advertisement of MLT profession. This way, the labor shortage in some regions could be tackled. However, it should be added that in the scientific/technical field, the profession of MLT is not seen as attractive looking at salary, personal flexibility and mobility. This lack of competitiveness with other careers could explain a big part of the current labor shortage, as most participants now state that they choose for a career in MLT because of the content (= helping patients).

When looking at the results for the FFL game (**figure 2**), it was observed that during the SWOT event most participants in the FFL project reacted enthusiastic on the FFL project and really see an important role for the FFL game and community in creating awareness and improving MLT education. Most participants see the game as being a digital 'full experience', in which patient cases should be provided to an MLT player from sample to diagnosis. It became apparent that two versions of the FFL game (point-and-click and VR) can provide specific strengths but also weaknesses. Specifically, it was seen as positive that the game formats can be focussed to a specific target group (point-and-click for secondary schools and VR for university colleges), but it should be taken into account that a VR game format has an effect on availability and playability of the game. Not every individual, or even institution, has the hardware which is necessary to integrate such a game format in their programmes. Although the FFL game creates a lot of opportunities in improving both awareness and MLT education, it became apparent that the target groups have high expectations. It will therefore be important to make well-argued decisions by the FFL consortium during game development in WP2, but also manage realistic expectations with the FFL community when looking at gameplay, visuals and content.

Figure 1: SWOT matrix for MLT education, mobility and profession

S	<p><u>MLT education</u></p> <ul style="list-style-type: none"> <li>Most students and professionals from all EMR regions agree that MLT students are still sufficiently prepared for taking the first steps in a medical laboratory, although there is a lack of specific lab equipment at schools.</li> </ul> <p><u>MLT profession</u></p> <ul style="list-style-type: none"> <li>In most EMR regions, MLT students and professionals do not find the job too complex/demanding since they retrospectively state to making a motivated and well-informed choice for the profession. (e.g. the interesting biomedical background and possibility to help patients are the primary motivations to choose for this education/profession)</li> <li>The MLT profession is typed as repetitive and non-repetitive by both MLT students and professionals at the same time. This is both a strength and a weakness for the profession. It should be advertised to students that the MLT profession can have specific focus/repetition or a big variety depending on what the individual professional prefers.</li> <li>In most EMR regions, the MLT profession supports employees to develop in their profession. This can be in MLT seniority but also in related roles (i.e. HR)</li> </ul>	<p><u>MLT education</u></p> <ul style="list-style-type: none"> <li>Students from secondary schools or university colleges who find the education program or MLT profession to complex, boring or even repetitive mostly point to a lack of transparency / information on the MLT profession or have (unfounded) prejudices.</li> <li>Knowledge of specific and automated laboratory equipment is not optimal or absent due to lack of these automatons at school. This gap between education and profession is clearly confirmed and detrimental in the long run.</li> <li>MLT professionals state that there is considerable variation in the skills, knowledge and especially motivation of students. This is seen as a significant problem for professional success.</li> </ul> <p><u>MLT mobility</u></p> <ul style="list-style-type: none"> <li>There is little to no cross-border mobility between the EMR regions. This adds to the problems of personnel shortage in some EMR regions.</li> </ul> <p><u>MLT profession</u></p> <ul style="list-style-type: none"> <li>The general career path and possibility of career development for an MLT professional is not known for MLT students.</li> <li>MLT professionals confirm that the possibility to promote and develop, although present, is limited in comparison to related technical professions in industry.</li> <li>MLT professionals state that salary is significantly lower than in industry. This has a negative effect on the attractiveness of the profession.</li> </ul>	W
O	<p><u>MLT education</u></p> <ul style="list-style-type: none"> <li>More and better advertising in secondary schools is necessary to improve the orientation of secondary school students to provide them with a realistic view of what the MLT profession entails.</li> <li>More information/orientation is also needed for MLT students. This to debunk the current prejudices and provide honest and complete information on the pro's and con's of the MLT profession.</li> <li>The MLT profession has hidden benefits and these can be tailored much better to the 'personality' and preferences of the individual student. A tool/game to make a better match between the type of student and the MLT profession can assist students in making an educated choice for MLT.</li> </ul> <p><u>MLT mobility</u></p> <ul style="list-style-type: none"> <li>Improving or allowing easier cross-border mobility, training and professional cooperation can make the search for professionals easier and career perspectives higher.</li> </ul>	<p><u>MLT education</u></p> <ul style="list-style-type: none"> <li>Providing information at secondary schools and MLT university colleges requires time/effort that MLT professionals and schools often lack. A strong cross-border community is needed to make this possible. The success of this community should be independent of subsidizing and all parties involved should have a sense of urgency to make this a priority.</li> <li>If the variety in knowledge and skills of students is not balanced out, current problems to find enough suitable professionals will likely remain.</li> </ul> <p><u>MLT mobility</u></p> <ul style="list-style-type: none"> <li>Rigid laws will make improving cross-border mobility problematic. In addition, language barriers are seen as a big limitation in improving cross-border work.</li> </ul> <p><u>MLT profession</u></p> <ul style="list-style-type: none"> <li>Low salary and an unattractive work-life balance can keep impeding with finding the best professionals for the future.</li> </ul>	T

Figure 2: SWOT matrix for FFL game

S	<p><u>General input</u></p> <ul style="list-style-type: none"> <li>All target groups (students, professionals and teachers) are enthusiastic about the FFL project and agree that a FFL serious game can be useful in both improving the quality of MLT education and creating positive awareness for the MLT profession.</li> <li>The FFL game adds an extra and innovative pedagogical approach for schools to use in their technical courses or specific MLT program</li> </ul> <p><u>Game format</u></p> <ul style="list-style-type: none"> <li>The development of multiple versions of the FFL game is seen as positive by all target groups, since it will allow better tailoring to their specific needs and wishes.</li> <li>A FFL game type based on VR is seen as innovative and exciting.</li> </ul> <p><u>Game content</u></p> <ul style="list-style-type: none"> <li>Competitive aspects (rewards, scores, challenges) embedded in the FFL game are seen as a positive addition for improving the motivation and cognitive development of students.</li> </ul>	<p><u>General input</u></p> <ul style="list-style-type: none"> <li>Not every target group and region for that matter has shown an equally high priority for the FFL game and project.</li> <li>If game quality (visuals and playability) and also especially game depth/context (the game scenario) are not well developed, the game will likely not be played or accepted by the target groups.</li> </ul> <p><u>Game format</u></p> <ul style="list-style-type: none"> <li>Students and teachers state that the game should always be accessible for students. For that reason, VR (and the necessary hardware to support VR gaming) is seen as a bottleneck by most EMR partners.</li> </ul> <p><u>Game content</u></p> <ul style="list-style-type: none"> <li>Equipment/automatons between hospitals in the EMR regions differ, which will make focussing on a specific automaton and its detailed operation difficult. This will likely make the game less attractive for certain EMR regions depending on the choices which are made by the FFL consortium during game development.</li> </ul>	W
O	<p><u>Game content</u></p> <ul style="list-style-type: none"> <li>The FFL game should address whole case scenarios (from patient sample to diagnosis) to improve the entire skill-set of MLT students and to improve awareness of the MLT profession for secondary school students.</li> <li>Competition in the game/challenges is seen as positive and should be tailor-made for the specific target group (e.g. more fun aspects for secondary schools).</li> <li>The FFL game should not focus on stress-provoking situations (e.g. working with time-limits) but on relevant skills of the MLT profession (e.g. decision-making, the preciseness and accuracy of the work)</li> <li>The FFL game should start 'easy' with a tutorial providing more instruction-based working and develop into a more independent gaming experience based on problem solving and increasingly complex challenges.</li> <li>The FFL game should focus on providing insight into the specific workings of laboratory automatons which are not available to university colleges.</li> <li>Reward systems should be implemented in the game (e.g. machine-unlocking).</li> <li>Levels/challenges/cases should be relatively short and not take too long to finish.</li> <li>Updates and actualizations for the game are important to keep the game up-to-date with innovations: both external and internal content should be updated regularly.</li> </ul>	<p><u>General input</u></p> <ul style="list-style-type: none"> <li>Beware that the FFL game does not replace real life education. They should go hand in hand and strengthen each other.</li> <li>Each target group asks for another game type. Game content, visuals and playability should be tailored to the specific audience. Management of expectations with target groups is important as requests and expectations are high. Time and resources are relatively limited.</li> </ul> <p><u>Game content</u></p> <ul style="list-style-type: none"> <li>The popularity of gaming with adolescents sets high standards for visuals and depth of the FFL game to become and remain interesting for student target groups.</li> <li>The focus (game scenario's) and easy availability of the FFL game is very important for all participants. Concerning focus the advice is not to focus the game on only one automaton or selective group of automatons.</li> <li>If the FFL game is to stressfull or should not cause stress.</li> <li>The game should not focus solely on the competitive aspect, but make it possible for the student to track his/her learning progress</li> </ul>	T

#### 4 FFL SWOT results: specific outcomes per EMR country

This chapter shortly summarizes the SWOT results which were not common for all EMR regions when considering MLT education, MLT profession (**see table 2**) and the FFL game (**see table 3**). These results are therefore specific and limited to one specific language region and are not shared by all consortium partners. The consortium partners will need to take these region-specific results into account during homogenization of MLT education and the development of the FFL game. Again, all results are obtained using the aforementioned SWOT methodology.

In the Walloon and Flemish regions, the MLT labor shortage was specifically addressed by numerous participants and also a lack of alignment between the MLT educational programmes and MLT profession. In addition, a structured integration of the profession and more in-depth cooperation between professionals and educational programmes were seen as regional focus-points. A lack of labor shortage was not observed or addressed in the Dutch and German regions. This was observed as a threat, as priority for the FFL game and community seems to be lower in specifically Dutch target groups.

There also seems to be some heterogeneity between all EMR regions when considering the educational programmes and legal requirements. Especially Flemish and German regions see an opportunity to gain cross-border cooperation and making it possible to share best-practices and educational tools. This will be further explored in WP4 of the FFL project.

Finally, the German region sees considerable threat in the VR format when looking at its accessibility for pupils and MLT students outside the classroom. This could have a considerable effect on the usability of the game for these target groups.

Table 2. Region-specific SWOT results for part A (MLT education and profession) which are not shared by the entire FFL consortium

Strengths (S)	
Dutch region	/
Flemish region	/
German region	/
Walloon region	<ul style="list-style-type: none"> <li>- Everybody can enter MLT studies, there is no entry exam so access is easy</li> <li>- The educational program is preparing students to have flexibility and adaptability which are important non-technical skills</li> </ul>
Weaknesses (W)	
Dutch region	<ul style="list-style-type: none"> <li>- There is almost no cross-border mobility from the Netherlands to Belgium although there is no language barrier. This is likely because of different legal requirements between these regions.</li> </ul>
Flemish region	<ul style="list-style-type: none"> <li>- MLT program/study is underestimated and often not as 1st choice but a lifeguard for academic bachelor drop-outs</li> <li>- There are not enough options for extra training and it highly depends on the size of the clinical lab</li> <li>- Students are unaware of the legal requirements for the MLT profession</li> <li>- Learning of skills works best 'on the spot' – educational program is now too much focussed on theory.</li> </ul>
German region	/
Walloon region	<ul style="list-style-type: none"> <li>- More practices and interactions with the MLT professional environment and MLT formation are required</li> <li>- Topics of MLT educational program not aligned with professional skills. Too much chemistry.</li> </ul>
Opportunities (O)	
Dutch region	/
Flemish region	<ul style="list-style-type: none"> <li>- This FFL project creates opportunity for bridge programs (from or to another study) or offer training programs using the FFL community</li> <li>- MLT Students should be allowed to switch work benches regularly in medical labs to learn different disciplines/techniques</li> <li>- The FFL game could assist MLT students interpreting and managing errors and soft-skills</li> </ul>
German region	<ul style="list-style-type: none"> <li>- A cross-border partnership between MLT schools of the EMR with opportunities of student exchange would be interesting.</li> </ul>
Walloon region	<ul style="list-style-type: none"> <li>- MLT profession encounters shortage (in Belgium). With an MLT diploma, a job is guaranteed.</li> </ul>
Threats (T)	
Dutch region	<ul style="list-style-type: none"> <li>- There is no labor shortage in the Netherlands, which makes the priority of this project smaller for some target groups.</li> </ul>
Flemish region	/
German region	/
Walloon region	<ul style="list-style-type: none"> <li>- Everybody can enter the MLT studies, no entry exam so entering skills are very heterogeneous. It implies difficulties for teaching but also for professionals when dealing with students coming for internship or with new MLT</li> </ul>



Table 3. Region-specific SWOT results for part B (the FFL game) which are not shared by the entire FFL consortium

Strengths (S)	
Dutch region	/
Flemish region	/
German region	- Availability as APP is absolutely important (bus, train)
Walloon region	/
Weaknesses (W)	
Dutch region	/
Flemish region	/
German region	- VR glasses are needed (additional costs)
Walloon region	/
Opportunities (O)	
Dutch region	/
Flemish region	- Include aspects of quality control/check
German region	- Not only high-tech automatons in the game, but also manual methods
Walloon region	- Due to the single user format, competition against oneself is enhanced compared to competition against others. - Open the development to integration of whole MLT tasks, not only focus on automatons. All doors are open for creativity. - Open the development to an overview of the MLT tasks in a hospital and work out clinical case studies.
Threats (T)	
Dutch region	- Because of the heterogeneity of the Dutch educational programs and legal requirements in comparison to the other countries, implementation of the FFL game will be more challenging
Flemish region	- The FFL game needs to be more than only working with automatons (not only focus on this) - Pre-analytical sample handling out of circle on influence of the MLT (game starts in the lab) - A high score in the FFL game does not mean your lab work will be excellent - The FFL game needs to clearly show the learning progress
German region	- Scepticism whether game will really help students to become fit for the job.
Walloon region	- Request for integration of whole MLT tasks and clinical case studies, challenging to stay realistic (time versus development's work)

#### 4. Conclusions and outlook

The results from this SWOT report provides a selection of interesting conclusions. It has become apparent that the MLT profession is not known by secondary school students and the MLT profession still gets almost no exposure in secondary schools across the EMR. The FFL project and the FFL can have an important role here in attracting more influx of secondary school students to university colleges, especially in EMR regions where there is labor shortage. It will be important to make the FFL game specifically tailored to tackle this problem without making it too 'difficult or detailed' for secondary school students. Surprisingly, although MLT students have already made a choice for their future profession, most MLT students enrolled in university colleges also have no good perspective on their future profession. This can also be a focus for the FFL project and game. Education (students) and profession (professionals) should be brought together more efficiently and the FFL game should provide a tool with two goals: i) improving the specific skills gap that has been confirmed by this SWOT report (e.g. automaton operation) and providing a more realistic and in-depth view what it means to become a MLT professional and how this professional can develop him- or herself throughout its entire career. Finally, it has become clear that a part of the labor shortage and unattractiveness of the MLT profession can be accounted to a low salary, job flexibility and possibility for career development in comparison to other science-oriented professions, especially in industry/commerce. This is something the FFL project cannot control but surely has its impact on the current situation. Making cross-border mobility in the entire EMR region more easy and also aiming for cross-border training exchange and homogenization of MLT programs can have an important positive impact on this issue.

Considering the development of the FFL game, it became apparent that most participants in the FFL project are very enthusiastic about the FFL project and really see an important role for the FFL game in creating awareness and improving education. However, most participants do not want the game to be restricted to one or a few automatons. Rather, it should provide the gamer with a professional 'experience', in this specific case from 'patient to diagnosis' with challenges and problems so that gamers are really immersed in their professional field and develop relevant skills. This advice, together with the fact that competitive games in this field have set a certain level of expectations, will create an important challenge that the consortium will have to overcome. Most target groups 'eat and breath' games and therefore expect a certain amount of content depth, quality visuals, easy gameplay, competitive aspects, reward systems,... and it will be challenging to make the right choices in game development to make the FFL game a success with the limited time that is available. In addition, there

is quite some heterogeneity in educational programs in the EMR but also in equipment used in laboratories across the EMR. It will therefore also be challenging to create gaming scenarios which fit for the entire EMR without lacking the necessary details to provide a relevant learning experience.

The results from this SWOT report will be used by the consortium partners in the remainder of the FFL project (specifically in work packages (WP) 2, 3 and 4 of the FFL project). Primarily, a prototype of the FFL game will be developed in 2022 by the consortium partners using two gaming types (point-and-click and VR). The FFL games will eventually be shared and tested by the target groups in each region during the last phase of the FFL project (2022-2023). More information on the FFL project, its partners or its upcoming agenda, are available on the project website: [www.funforlab.eu](http://www.funforlab.eu)

## 5. Appendices

### Appendix I – SWOT invitations (english version – Walloon region) and SWOT event program



Dear colleagues,

The Centre de Recherche des Instituts Groupés (CRIG) together with the paramedical department of the Haute Ecole Libre Mosane (HELMo) are pleased to carry out the FUNFORLAB project which has been accepted under call 6 of the European INTERREG Euregio-Meuse-Rhine (EMR) funding.

The main objective of the FUNFORLAB project is the development of an ICTE learning game in the framework of social inclusion in education. Indeed, this project proposes in particular to improve the work of specific skills on the automatons present in the clinical biology laboratories. In this way, we hope to increase the employability of MLTs and also to arouse the interest of secondary school pupils, via the FUNFORLAB game, in science in general and to motivate them to enroll in the MLT cursus.

To design this ICTE, we need your experience as a teacher. Your approach in secondary and/or higher education would be a major asset for the design of the FUNFORLAB game.

An important hybrid event will take place on 23 November 2021 from **12 pm to 5 pm** in Sittard-Geleen in the Netherlands, both face-to-face at the Brightlands Chemelot campus of the Zuyd Hogeschool and online. On that day, a SWOT (Strength, Weakness, Opportunities, Threats) analysis of the training and profession of TLM in EMR will be organized. We need your participation as teachers in order to get your opinions and concrete feedback from the field.

You will find the general programme of the event below :

- 12h00- 12h30 : Welcome and Registration – Walking Lunch
- 12h30- 13h30:
  - Opening Session – What is FUNFORLAB ?
  - Keynote speaker
- 13h45-15h45 : Breakout SWOT sessions ( online/onsite) per EMR language region

- 16h-16h15: Closing Session – FUNFORLAB in the future
- 16h15-17h Networking with drinks and appetizers/Company market

If you are interested in this unique event in the EMR region, you can answer positively via this [online form](#) and/or visit our website [www.funforlab.eu](http://www.funforlab.eu).

Thanking you in advance for your interest and attention to the training of Medical Laboratory Technologists in the Liège region and more widely in the EMR.

Best regards,

The FUNFORLAB team

Time	Activity	Room Center Court (Building 200)
12.00 - 12.30	Registration	Ground Floor
12.00 - 12.30	Lunch	Room 200.2.019a (Arthur)
12.30 - 12.45	Opening Session <i>'Welcome to FUNFORLAB'</i>  Speaker: Dr. Annabelle Lejeune (HELMo)	Room 200.2.019a (Arthur)
12.45 - 13.30	Keynote session <i>'From serious gaming to immersive learning; Unlocking the potential of virtual reality for education'</i>  Speaker: Dr. Stéphane Grade (CECOTEPE – EPAMU – HEPL)	Room 200.2.019a (Arthur)
13.30 - 13.45	Break	Second Floor
13.45 - 15.45	FUNFORLAB SWOT sessions:  <ul style="list-style-type: none"> <li>• SWOT Dutch Region</li> <li>• SWOT Flemish Region</li> <li>• SWOT German Region</li> <li>• SWOT Walloon Region</li> </ul>	Second Floor  Room 200.2.019a (Arthur) Room 200.2.028 (Bors) Room 200.2.027 (Tristan) Room 200.2.019b (Arthur)
15.45 - 16.00	Break	Second Floor
16.00 - 16.15	Closing Session <i>'A first and future look at FUNFORLAB'</i>  Speaker: Aurélien Bolkaerts (CeCoTePe)	Room 200.2.019a (Arthur)
16.15 - 17.00	Drinks and Appetizers - Visual Learning Market	Second Floor

## Appendix II – Summary of Raw Data from FFL SWOT event

These tables (**tables 4-8**) provide an overview of raw quantitative voting behavior gained from the KAHOOT sessions during the SWOT event. The voting behavior on each statement per region is provided, and pooled percentages from all participant groups per region are depicted. For the number of participants per target group and region, see table 1 chapter 3. Per statement, the most voted option (agree or disagree) for the entire EMR is highlighted.

The voting in these tables, in addition to narrative input during the SWOT sessions, has been used to construct 2 final SWOT matrices (1 for MLT education/profession and 1 for the FFL game). In these SWOT matrices, all common input for the entire EMR region received during the SWOT event is summarized. These SWOT matrices provide an overview of essential strengths, weaknesses, opportunities and threats for the entire EMR region and the FFL project.

Table 4: Raw data from SWOT session A – part 1 (average EMR voting is non-weighted voting average)

<b>The education program to become an MLT professional is too complex and demanding</b>			
	<i>AGREE</i>	<i>NEUTRAL</i>	<i>DISAGREE</i>
Dutch region	4%	58%	38%
Flemish region	6%	36%	58%
German region	45%	9%	46%
Walloon region	22%	56%	22%
<b>Average EMR voting</b>	<b>19%</b>	<b>40%</b>	<b>41%</b>
<b>Working as an MLT professional is boring, repetitive and even dangerous work</b>			
	<i>AGREE</i>	<i>NEUTRAL</i>	<i>DISAGREE</i>
Dutch region	34%	4%	62%
Flemish region	30%	20%	50%
German region	1%	17%	82%
Walloon region	6%	32%	62%
<b>Average EMR voting</b>	<b>17%</b>	<b>18%</b>	<b>64%</b>
<b>Students get a good (re)presentation in their classes what it means to become and be an MLT professional</b>			
	<i>AGREE</i>	<i>NEUTRAL</i>	<i>DISAGREE</i>
Dutch region	50%	50%	0%
Flemish region	38%	12%	50%
German region	5%	35%	60%
Walloon region	38%	22%	40%
<b>Average EMR voting</b>	<b>32%</b>	<b>30%</b>	<b>38%</b>

Table 5: Raw data from SWOT session A – part 2 and 3 (average EMR voting is non-weighted voting average)

<b>At the moment, a student is technically well prepared for his first internship in a medical laboratory.</b>			
	<i>AGREE</i>	<i>NEUTRAL</i>	<i>DISAGREE</i>
Dutch region	38%	62%	0%
Flemish region	70%	20%	10%
German region	18%	62%	20%
Walloon region	24%	44%	22%
<b>Average EMR voting</b>	<b>38%</b>	<b>49%</b>	<b>13%</b>
<b>No amount of training can really prepare you for the real life work situation BUT the skills needed to be flexible and adaptable; those are crucial.</b>			
	<i>AGREE</i>	<i>NEUTRAL</i>	<i>DISAGREE</i>
Dutch region	38%	50%	22%
Flemish region	78%	11%	11%
German region	65%	15%	20%
Walloon region	60%	30%	10%
<b>Average EMR voting</b>	<b>60%</b>	<b>26%</b>	<b>14%</b>
<b>It does not matter if an MLT professional got his education in Belgium, the Netherlands or Germany. It is the same job and the MLT professional should be able to work in the whole EMR region without restrictions.</b>			
	<i>AGREE</i>	<i>NEUTRAL</i>	<i>DISAGREE</i>
Dutch region	84%	8%	8%
Flemish region	58%	42%	0%
German region	56%	26%	18%
Walloon region	76%	18%	6%
<b>Average EMR voting</b>	<b>69%</b>	<b>23%</b>	<b>8%</b>
<b>The MLT profession is just not attractive enough. Salary is relatively low and there is too little flexibility to make the job appealing.</b>			
	<i>AGREE</i>	<i>NEUTRAL</i>	<i>DISAGREE</i>
Dutch region	100%	0%	0%
Flemish region	/	/	/
German region	40%	20%	40%
Walloon region	32%	36%	32%
<b>Average EMR voting</b>	<b>57%</b>	<b>19%</b>	<b>24%</b>
<b>There are plenty of options for an MLT professional to develop further skills/knowledge as an MLT professional.</b>			
	<i>AGREE</i>	<i>NEUTRAL</i>	<i>DISAGREE</i>
Dutch region	40%	40%	20%
Flemish region	/	/	/
German region	/	/	/
Walloon region	/	/	/
<b>Average EMR voting</b>	<b>40%</b>	<b>40%</b>	<b>20%</b>

Table 6: Raw data from SWOT session B – part 1 and 2 (average EMR voting is non-weighted voting average)

<b>A FUNFORLAB serious game can help institutions improve their MLT program</b>			
	<i>AGREE</i>	<i>NEUTRAL</i>	<i>DISAGREE</i>
Dutch region	100%	0%	0%
Flemish region	90%	10%	0%
German region	74%	6%	20%
Walloon region	78%	18%	4%
<b>Average EMR voting</b>	<b>86%</b>	<b>8%</b>	<b>6%</b>
<b>The content of the game should focus on acquiring detailed skills/knowledge on a specific automaton.</b>			
	<i>AGREE</i>	<i>NEUTRAL</i>	<i>DISAGREE</i>
Dutch region	25%	55%	20%
Flemish region	38%	24%	38%
German region	80%	10%	10%
Walloon region	24%	22%	54%
<b>Average EMR voting</b>	<b>42%</b>	<b>27%</b>	<b>31%</b>
<b>A serious game for MLTers should focus solely on the workings of a diagnostic lab or a specific automaton/equipment. Creating a world in which the gamer also gets a general idea on the workings of a hospital is not necessary.</b>			
	<i>AGREE</i>	<i>NEUTRAL</i>	<i>DISAGREE</i>
Dutch region	22%	54%	24%
Flemish region	58%	0%	42%
German region	30%	25%	35%
Walloon region	22%	30%	48%
<b>Average EMR voting</b>	<b>33%</b>	<b>30%</b>	<b>37%</b>
<b>The format and visuals of the FUNFORLAB game (2D, 3D, VR, ...) are not important for the success of the game. It is all about content.</b>			
	<i>AGREE</i>	<i>NEUTRAL</i>	<i>DISAGREE</i>
Dutch region	15%	20%	65%
Flemish region	24%	38%	38%
German region	16%	26%	58%
Walloon region	24%	22%	56%
<b>Average EMR voting</b>	<b>20%</b>	<b>26%</b>	<b>54%</b>
<b>A competitive aspect can improve the attractiveness and success of the FUNFORLAB game.</b>			
	<i>AGREE</i>	<i>NEUTRAL</i>	<i>DISAGREE</i>
Dutch region	42%	50%	8%
Flemish region	76%	12%	12%
German region	55%	32%	13%
Walloon region	42%	22%	36%
<b>Average EMR voting</b>	<b>54%</b>	<b>29%</b>	<b>17%</b>
<b>The game should have a problem-based set-up instead of an instructive set-up.</b>			
	<i>AGREE</i>	<i>NEUTRAL</i>	<i>DISAGREE</i>
Dutch region	70%	30%	0%
Flemish region	58%	42%	0%
German region	72%	24%	4%
Walloon region	52%	28%	20%
<b>Average EMR voting</b>	<b>63%</b>	<b>31%</b>	<b>6%</b>



Table 7: Raw data from SWOT session B – part 3 and 4 (average EMR voting is non-weighted voting average)

<b>The FUNFORLAB game should only be available via download on the FUNFORLAB website</b>			
	<i>AGREE</i>	<i>NEUTRAL</i>	<i>DISAGREE</i>
Dutch region	22%	36%	42%
Flemish region	16%	42%	42%
German region	12%	30%	58%
Walloon region	22%	24%	54%
<b>Average EMR voting</b>	<b>18%</b>	<b>33%</b>	<b>49%</b>
<b>The FUNFORLAB game should contain different difficulty levels and chances to re-play</b>			
	<i>AGREE</i>	<i>NEUTRAL</i>	<i>DISAGREE</i>
Dutch region	100%	0%	0%
Flemish region	100%	0%	0%
German region	85%	10%	5%
Walloon region	86%	8%	6%
<b>Average EMR voting</b>	<b>93%</b>	<b>4%</b>	<b>3%</b>

## Appendix III - Example of FFL questionnaire for teachers (english version – Walloon region)

# Your opinion for FUNFORLAB

## Secondary schools: Teacher form

In spring 2021, the HELMo high school, the CeCoTePe research center of the HEPL high school and their partners from the Euroregion Meuse-Rhine (EMR) launched the Interreg FUNFORLAB project for the profession of medical laboratory technologist (MLT).

The project objectives are multiple: to promote the profession of MLTs, to homogenize training in the EMR, to strengthen regional mobility and more broadly promote science courses at the end of secondary education.

To achieve these goals, two video game games called FUNFORLAB will be created, one using virtual reality and the other using the "point and click 3D" mode. These two games will immerse the player in a medical analysis laboratory and allow him to confront learning situations of different levels of difficulty.

More information about the project can be found on our website: [www.funforlab.eu](http://www.funforlab.eu) (<http://www.funforlab.eu>) and at <https://www.interregemr.eu/projecten/funforlab> (<https://www.interregemr.eu/projecten/funforlab>) .

On November 23, 2021, a SWOT event took place. We discussed the strengths and weaknesses of education and the MLT profession with students and professors at our high schools. We also asked them about the development of video games. However, we also seek the advice of laboratory experts/MLT professionals, as well as secondary school students and teachers.

With this questionnaire, we want to collect your opinion. It will take you a maximum of 15 minutes of your time, but it will provide us with very valuable information.



## Information about your high school teacher profile

1. In which school(s) do you currently teach? (Full name(s))

2. What is your status as a teacher ?

- ☐ Substitute
- ☐ Temporary
- ☐ Appointed

3. In which field do you teach?

- ☐ General
- ☐ Technical
- ☐ Professional

4. Do you teach science subjects ?

- ☐ Yes
- ☐ No

5. Do you have any clarification on this information

## Questions about the studies and profession of medical laboratory technologist (MLT).

6. You have a good picture of what the MLT professional does.

- ☐ Agree
- ☐ Disagree
- ☐ I don't have an opinion

7. Please comment your previous answer.

8. The teaching program to become a MLT professional seems too complex and demanding.

- ☐ Agree
- ☐ Disagree
- ☐ I don't have an opinion

9. Please comment your previous answer.

10. Working as a MLT professional seems boring, repetitive and even dangerous.

- ☐ Agree
- ☐ Disagree
- ☐ I don't have an opinion

11. Please comment your previous answer.

12. The MLT profession does not attract your students as well as the scientific professions in general.

- ☐ Agree
- ☐ Disagree
- ☐ I don't have an opinion

13. Please comment your previous answer.

## Questions about the FunForLab game development.

14. For you, the format and visual elements of the FunForLab game are not important for the success of the game. It's all about content.

- ☐ Agree
- ☐ Disagree
- ☐ I don't have an opinion

15. Please comment your previous answer.

16. While playing FunForLab, the player will have to be able to complete challenges rather than receiving instructions on how something works.

- ☐ Agree
- ☐ Disagree
- ☐ I don't have an opinion

17. Please comment your previous answer.

18. The game should have different levels of difficulty.

- ☐ Agree
- ☐ Disagree
- ☐ I don't have an opinion

19. Please comment your previous answer.

20. The use of gamification will make your students more inclined to choose a scientific training or even a MLT training.

- ☐ Agree
- ☐ Disagree
- ☐ I don't have an opinion

21. Please comment your previous answer.

### Your participation for the continuation of the FunForLab project

22. Would you be interested in testing one or more FunForLab game prototype with your students, accompanied by one or more members of the FunForLab team ?

- ☐ Yes
- ☐ No

23. Which period would suit you best to test one (or more) prototype(s) of FunForLab game in your classes?

- ☐ May 2022
- ☐ June 2022
- ☐ September 2022
- ☐ October 2022

24. Why are you not interested in that?

25. Comments on your interest in testing one or more game prototype(s).

**The whole FunForLab team thanks you for your participation!**

We will come back to you soon to test prototypes of the games.

In the meantime, you can follow the project progress on <https://funforlab.eu>  
 Or contact us via the address [info@funforlab.eu](mailto:info@funforlab.eu).

