**Requirement report**

According to the previous meetings with Manos Sfakianakis, who is the leader of the Pulmonary Rehabilitation team, we have collected a lot of useful information about the user requirements for the project. For analyzing these data in a comprehensive and qualitative way, we used thematic analysis method to identify and organize the patterns and themes representing some important information about the data in relation to the overall research questions driving the project. NVivo is such a useful qualitative data analysis (QDA) software, which is designed to help researchers working with rich text-based or multimedia data do deeply qualitative analysis and organize, classify, sort and summarize the significant information.

The process of the thematic analysis is similar to the stages of other qualitative research analysis. Firstly, it is necessary to make yourself get familiar with the data. In this stage, it is important to browse the transcription of the interviews and label relevant and important ideas impressing you or being repeated for many times. Then it is the time to generate the initial codes in NVivo (themes) and collate the data relevant to the responding nodes. Next step is collating nodes relevant to themes. Meanwhile, it is also important to decide the prioritization of these nodes based on their importance. In this stage, data was conceptualized on an abstract level for providing a more general and entire idea about the research. In the final stage, the themes will be refined and labeled. Additionally, the priorities of the themes will be captured and the connection among these themes can be figured out as well. Analyzing data by following this guideline steps, we can get some new knowledge and have a comprehensive understanding from the perspective of the participants.

Based on the fact of that both students and the team are the users of our project, when the requirements are analyzed, it is better to divide the user requirements into two parts, which are front-end and back-end.

**Front-end:**

1. **Interface**
   1. Keep the contents of the screen should be concise and clear so as for motivating people to keep learning.
   2. The theme of the platform should be similar to the Sarah Matthews online courses.
   3. In terms of the design, although the user does not have ideas, it would be good to have some basic standard website settings. The user mentioned:
      1. It should be a landing page where an introduction will be given to tell people important information about what the platform is built for.
      2. It is important to have a list of these units and other resources so as for make the units organized and structured.
2. **Login**
   1. This platform shall be accessible to every student.
   2. The platform shall have a light registration in which way that the learning history of students can be recorded. For example, the platform would randomize usernames and passwords for students to allow them track their study.
   3. It should be flexible for students to choose to register themselves or start learning directly in appropriately four hours. There shall be no strict limit on the registration and log-in option.
   4. The platform would ask students to fill in a form of basic information, including sex, university, age, course of study, master/bachelor 4-year study program, a number of 1 to 8 telling which number of placements they are attending.
   5. In the future, we can consider that how to only track our own students’ study progress and their data. For now, we only have some suggestions, for example, generating usernames and passwords and pass them to the universities. When the placements are confirmed, the universities would pass the usernames and passwords to the students.
3. **materials**
   1. **audio and video**
      1. The video or audio shall be fully embedded into the page with a video or audio window and it can be played inside the page. Which should be noticed is that the permission of the audio or video resources could be restricted in some situations. However, if the resources belong to the team itself, it would be fine.
   2. **Picture**
      1. The platform shall provide pictures for helping students study.
      2. The platform would be ideal to have the form of changing the highlight parts of a picture when students move the mouse. (The format is still not clear, maybe a picture from other sites, and we still don’t know whether it is public)
   3. **Reference**
      1. The platform shall provide some extra resource references for students’ further studies. It could be a tab on its own or provided at the end of each unit.
   4. **Scenarios**
      1. The platform shall provide some stories or scenarios to help students understand and apply the knowledge they learn from the materials to the real life.
   5. **Text**
      1. The platform shall provide articles and text to students to read and learn.
4. **Navigation**
   1. During the process of learning, the platform shall allow students to jump to other units if they want to review some information from other units.
   2. In the teaching contents pages, there shall be category tabs directing students to the specific categories and directing students to go back when they finish studying the knowledge linked by that tab.
   3. The platform shall also allow students jump around the different subcategories also inside the unit freely.
5. **safety & privacy**
   1. It is significant to provide information about the privacy on the landing page to inform students that what data will be used and what these data would be used for. Actually, students’ data would not be assessed formally or identified individually. Instead, data would be only used for improving the system.
6. **unit**
   1. **certificate & reward**
      1. The platform shall provide a certificate or reward at the end of every unit when students finish the unit. The aim of the certificate is only for motivating students to keep learning.
      2. When students finish all units, the platform shall provide a final quiz. If students pass the final quiz, they would get a certificate of the course. (grade is not necessary to be presented on the certificate)
   2. **Introduction**
      1. In the introduction page of each unit, there shall provide the information about how long it would take to finish each unit (usually 45 minutes to 1 hour) and also the learning outcome needs to be achieving.
   3. **learning outcome**
      1. All the learning outcomes shall be assessed through the quizzes or the questions.
      2. Every quiz shall offer the confirmation that the learning objectives have been achieved.
   4. **process**
      1. **flow**
         1. The platform shall allow students to start with any unit because students may need to review and refresh some knowledge. The platform shall provide flexibility for students to access to the materials without having to go through the whole platform.
      2. **progression bar**
         1. The platform shall provide a progression bar to remind students how far they have done in terms of the unit and module.
         2. The procession bar shall be presented how many modules you have finished over the total modules in the form of numbers or percentages.
      3. **time**
         1. It shall be wise to keep the essential materials among all units in four hours.
         2. It shall be flexible for the time taken in the external resources**.**
         3. The time distributed to the different units may be different according to their different amount of information.
         4. The platform shall set a time limit (2 weeks) for the study of the course, so as for motivating students’ studies.
   5. **quiz** 
      1. **appearing**
         1. The platform shall be able to embed small quizzes and questions inside each unit so as for checking students’ understanding of some specific knowledge.
         2. The platform shall be able to provide a final quiz to check the whole understanding of students at the end of some unit, although it may not be compulsory.
      2. **condition**
         1. The platform shall advise students to study by following the flow (from unit 1 to unit 4) instead of picking up one unit to learn randomly.
         2. The platform shall be flexible for students to choose the way they like to study. The platform shall not restrict students to enter the next unit even though they may not finish the final quiz in the current unit, because the aim of the platform is promoting learning to everyone.
         3. If students do some questions wrongly, the platform would provide the number of their wrong answers among all questions. In this way, students can figure out which questions they answer wrongly by themselves, which can help their learning.
         4. The platform shall be able for students to restart the quiz.
         5. If students would like to restart the quiz, the platform would be able to randomize the order of the questions and options.
      3. **results**
         1. The platform could provide a grade when students complete the quiz.
         2. The platform could keep a record of how many questions students answer incorrectly over all questions throughout all units. The tracking results representing the performance of students shall be shown at the end of the unit.
         3. The platform shall provide the correct answers and explanations for students to check.
         4. The platform may provide the time students spent for each quiz, if students think it is necessary and useful.
      4. **Indicator**
         1. **Correct answers**
            1. The platform shall be able to provide the correct answers immediately after students give their answers to check how they do.
            2. The platform shall be able to provide all correct answers all together when students complete all questions to help students review the questions.
         2. **Explanations**
            1. The platform shall provide the explanations for the correct answers, however it is important to consider about the time of the content based on what the National Education for Scotland said.
         3. **Hints**
            1. The platform may provide some hints if it is necessary to help students to solve the questions.
      5. **Type**
         1. The platform shall provide case study questions.
         2. The platform shall provide drag and drop questions. It can help students apply the knowledge into clinical practice.
         3. The platform may provide gap filling questions. (If we find it in a literature saying it is a very good way to do.)
         4. The platform shall provide long answer questions. Because long answer questions can motivate students collect all information in their brain in order to compose some ideas.
         5. The platform shall provide multiple choicequestions**.** It is easy for quantitive analysis and evaluating.
         6. The platform shall provide True or False questions. It is easy for quantitive analysis and evaluating.

**Back-end:**

1. **Data analysis**
   1. The data about how students do the quiz (how many questions they answer incorrectly in each unit) could be recorded so as for informing students where they have most mistakes and needs to be revisited later. Additionally, the questions answered incorrectly by most students would need to be improved.
   2. The data gathered from multiple choice and True or False could be recorded and used for analyzing.
2. **Interface usability**
   1. The back-end interface of the platform shall be easy to use and maintain for staff having different computer levels even without the support from the IT people.
   2. The back-end interface of the platform shall be easy to add all possible kinds of resources including texts, pictures, audios and videos, and quizzes.
   3. The back-end shall be easy to reorder and enrich the contents if the platform would be expanded in the future.
3. **Recording**
   1. All false answers students make shall be recorded for analysis and improvement of the platform and for students’ self-assessments.
   2. The back-end shall record a list of students’ basic information (name, birth of date, sex)
4. **Update**
   1. The back-end of the platform shall be updated easily and frequently.