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eSleep\_dHealth

**Digital literacy enables up-to-date sleep medicine in inclusive  
healthcare**

***eSleep\_dHealth***

**Document: Assessment of the eSleep\_dHealth Open  
Educational Resources (OERs)**

Developed by the *Reykjavik University*



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# 1 Introduction

The eSleep\_dHealth course (Open Educational Resources – OERs) was implemented from February 2025 to July 2025 and consisted of three modules – **Sleep Medicine, Digital Health, and Entrepreneurship** – along with the **First Learning Expedition**.

The three modules provided students with foundational knowledge and practical skills to understand unmet medical needs in sleep medicine, apply digital solutions, and create practical, user-centered interventions. The First Learning Expedition allowed students to apply this knowledge in practice, working in international teams on a real-world challenge – increasing CPAP therapy compliance at home for older adults. Guided by mentors and using design thinking methods, students developed user-centered solutions and presented them to professors.

This document presents the assessment of the eSleep\_dHealth course, evaluating its effectiveness and impact, focusing on:

- Student satisfaction with the content and learning experience
- Relevance and applicability of the modules to real-world challenges
- Impact of the First Learning Expedition on skills development and practical understanding

The assessment provides valuable insights into how successfully the course fostered competencies in social innovation, interdisciplinary collaboration, and digital health solutions, and serves as a foundation for further improvement of the programme.

## 2 Methodology

The assessment aimed to evaluate the effectiveness of the eSleep\_dHealth course and gather students' feedback on its modules and learning activities. The main objectives of the assessment are:

- Measure student satisfaction and perceived learning outcomes across modules.
- Evaluate the usability and effectiveness of the eSleep\_dHealth Social Innovation Toolkit.
- Identify strengths and areas for improvement in course design and delivery.
- Provide insights for future adaptations and scaling of the course.

The questionnaire was sent to students who participated in at least one of the following:

1. Sleep Medicine Module
2. Digital Health Module
3. Entrepreneurship Module (excluding participants of the First Learning Expedition)
4. First Learning Expedition in Crete.

The questionnaire was implemented using REDCap, a secure web platform for building and managing online databases and surveys. REDCap ensures confidentiality, and student responses could not be traced to individuals. Prior to participation, students received a letter explaining that they would receive a personal survey link and that their answers would remain anonymous.

The questionnaire was divided into five main sections:

1. **General Feedback** – overall impressions of the eSleep\_dHealth course and its impact on learning.
2. **Sleep Medicine Module Feedback** – evaluating content, clarity, and applicability of the Sleep Medicine module.
3. **Digital Health Module Feedback** – evaluating content, clarity, and applicability of the Digital Health module.
4. **Entrepreneurship Module Feedback** – assessing content and learning experience (excluding First Learning Expedition participants).
5. **First Learning Expedition Feedback** – evaluating the experiential learning, team collaboration, and design thinking activities.



The questionnaire included both quantitative and qualitative question types. Quantitative questions used a Likert scale to measure student satisfaction, perceived usefulness of the course, and learning outcomes. Qualitative questions allowed students to provide detailed feedback, suggestions, and personal reflections on their experiences, offering deeper insights into the effectiveness of the course and areas for improvement.

### **PART 1: General Feedback**

1. How satisfied are you with the *overall structure and delivery* of the eSleep\_dHealth course?
  - Very dissatisfied
  - Dissatisfied
  - Neutral
  - Satisfied
  - Very satisfied
2. How do you rate the *balance between theory and practice*?
  - Very poor
  - Poor
  - Acceptable
  - Good
  - Excellent
3. To what extent was the course relevant to your academic and/or professional goals?
  - Not relevant at all
  - Not very relevant
  - Somewhat relevant
  - Relevant
  - Very relevant

### **PART 2: Sleep Medicine Module Feedback**

1. Did you take the Sleep Medicine Module course?
  - Yes
  - No
2. *BEFORE* this module, how would you rate your knowledge/skills in sleep medicine?
  - I knew nothing
  - I knew something, but could not apply it independently
  - I could apply it in familiar situations
  - I could apply it independently and adapt it to new contexts



- I could teach someone else
3. *AFTER* completing the module, how would you rate your knowledge/skills now?
    - I know nothing
    - I know something, but cannot apply it independently
    - I can apply it in familiar situations
    - I can apply it independently and adapt it to new contexts
    - I can teach someone else
  4. How would you rate the *quality and clarity* of the educational materials?
    - Very poor
    - Poor
    - Acceptable
    - Good
    - Excellent
  5. What did you find most useful in this module?
  6. Suggest one improvement for this module.

### **PART 3: Digital Health Module Feedback**

1. Did you take the Digital Health Module course?
  - Yes
  - No
2. *BEFORE* this module, how would you rate your knowledge/skills in digital health?
  - I knew nothing
  - I knew something, but could not apply it independently
  - I could apply it in familiar situations
  - I could apply it independently and adapt it to new contexts
  - I could teach someone else
3. *AFTER* completing the module, how would you rate your knowledge/skills now?
  - I know nothing
  - I know something, but cannot apply it independently
  - I can apply it in familiar situations
  - I can apply it independently and adapt it to new contexts
  - I can teach someone else
4. How would you rate the *quality and clarity* of the educational materials?
  - Very poor
  - Poor



- Acceptable
  - Good
  - Excellent
5. Did the module help you understand how digital tools support sleep medicine?
- Not at all
  - Slightly
  - Moderately
  - Very
  - Extremely
6. What did you find most useful in this module?
7. Suggest one improvement for this module:

#### **PART 4: Entrepreneurship Module Feedback (excluding First Learning Expedition)**

1. Did you take part in the Entrepreneurship Module course?
- Yes
  - No
2. *BEFORE* this module, how would you rate your knowledge/skills in entrepreneurship and innovation?
- I knew nothing
  - I knew something, but cannot apply it independently
  - I could apply it in familiar situations
  - I could apply it independently and adapt it to new contexts
  - I could teach someone else
3. *AFTER* completing the module, how would you rate your knowledge/skills now?
- I know nothing
  - I know something, but cannot apply it independently
  - I can apply it in familiar situations
  - I can apply it independently and adapt it to new contexts
  - I can teach someone else
4. How would you rate the *quality and clarity* of the educational materials?
- Very poor
  - Poor
  - Acceptable
  - Good
  - Excellent



5. What did you find most useful in this module?
6. Suggest one improvement for this module.

#### **PART 5: First Learning Expedition Feedback**

1. Did you take part in the First Learning Expedition in Crete?
  - Yes
  - No
2. How would you rate your *overall experience* during the First Learning Expedition?
  - Very Poor
  - Poor
  - Acceptable
  - Good
  - Excellent
3. How useful were the seminars, workshops, and assignments in applying entrepreneurial methods?
  - Not at all useful
  - Slightly useful
  - Moderately useful
  - Very useful
  - Extremely useful
4. Did the practical activities help you better understand innovation and design in digital health and sleep medicine?
  - Not at all
  - Slightly
  - Moderately
  - Very
  - Extremely
5. How would you rate your experience working in student teams during the course and the First Learning Expedition?
  - Poor
  - Fair
  - Good
  - Very good
  - Excellent
6. How effective was the communication within your team?



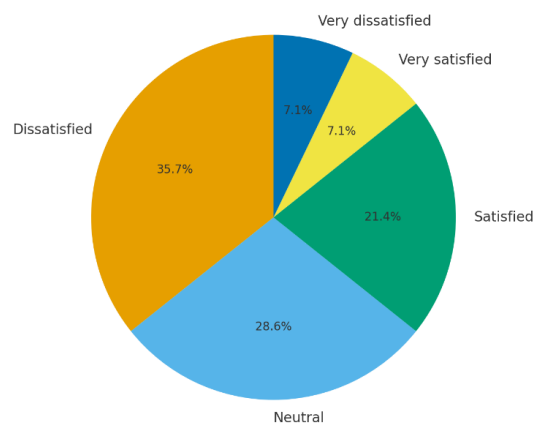
- Very ineffective
  - Ineffective
  - Neutral
  - Effective
  - Very effective
7. Did your team manage to distribute tasks and collaborate fairly?
- Never
  - Rarely
  - Occasionally
  - Most of the time
  - Always
8. To what extent did the course help you improve your teamwork and collaboration skills?
- Not at all
  - Slightly
  - Moderately
  - Very
  - Extremely
9. How did you find working in an international and interdisciplinary student environment?
- Not enjoyable
  - Challenging
  - Neutral
  - Enjoyable
  - Very enjoyable and enriching
10. What skills or insights did you gain from the First Learning Expedition that you found most valuable?
11. Suggest one improvement for the Second Learning Expedition.

### 3 Assessment Results

In total, 28 students responded to the first part of the questionnaire (General), 21 students answered the second part of the questionnaire (Sleep Medicine), 15 students answered the third part of the questionnaire (Digital Health), 16 students answered the second part of the questionnaire (Entrepreneurship), 14 students answered the fifth part of the questionnaire (First Learning Expedition)..

The **General Feedback** section provided valuable insights into students' perceptions of the eSleep\_dHealth course.

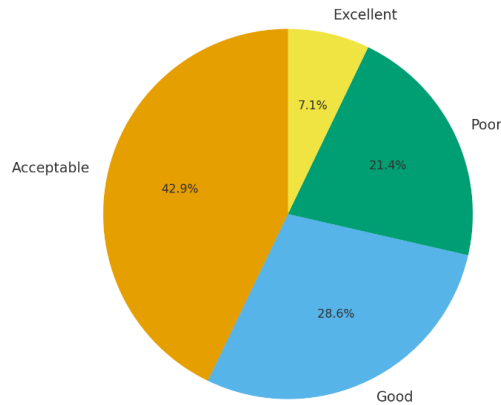
For the **overall structure and delivery**, the majority of students rated the course from neutral to very satisfied (57.1%), indicating generally positive experiences with room for improvement.



Source: Assessment of the eSleep\_dHealth OERs survey

**Graphic 1 Overall satisfaction with eSleep\_dHealth course**

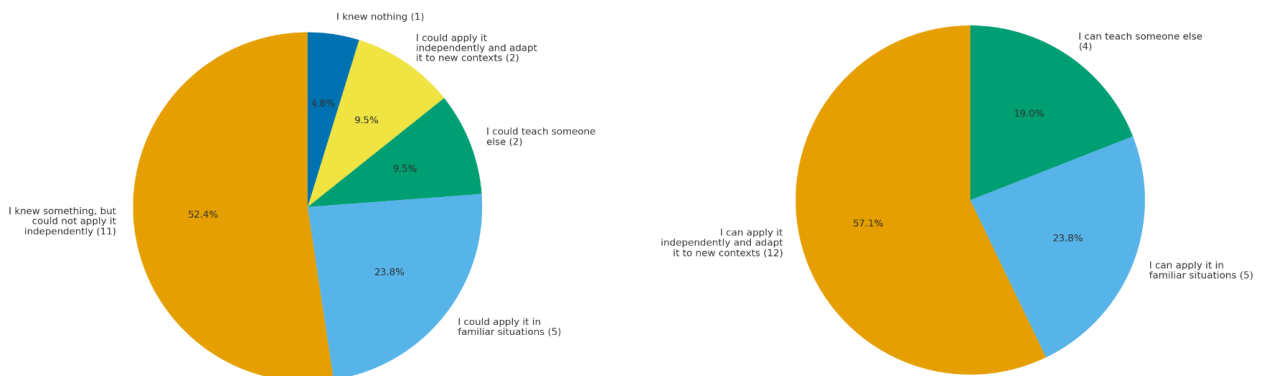
When evaluating the **balance between theory and practice**, most students rated it as acceptable to excellent (78.6%), suggesting that the practical components were well received and that the course offered a good integration of theoretical and applied knowledge. In terms of **relevance to academic and professional goals**, the majority of students rated the course as somewhat relevant to very relevant (60.7%), showing that students recognized its value for their studies and future careers, though further alignment with professional pathways could enhance its impact.



Source: Assessment of the eSleep\_dHealth OERs survey

**Graphic 2 Relevance to academic/professional goals**

The **Sleep Medicine Module** showed a clear **increase in students' knowledge and skills**. Before the module, over half of the students (52.4%) reported having some knowledge but being unable to apply it independently, while only 19% felt confident applying or teaching the material. After completing the module, the majority indicated significant improvement, with 57.1% stating they could apply their knowledge independently and 19% able to teach others.



Source: Assessment of the eSleep\_dHealth OERs survey

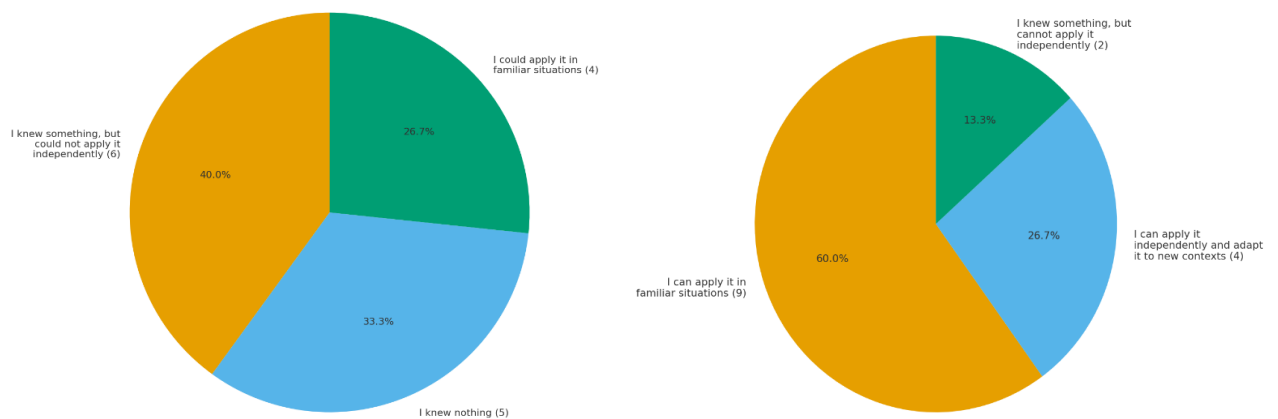
**Graphic 3 Sleep Medicine Module - knowledge/skills before and after**

The **quality and clarity of educational materials** were positively rated, with over 60% of students evaluating them as good or excellent, and 38.1% finding them acceptable.

In open-ended responses, students highlighted comprehensive coverage of sleep disorders, high-quality educational and video materials, expert input, and teamwork with peers from different countries as the most valuable aspects of the module.

Suggestions for improvement focused mainly on better organisation and communication, including clearer deadlines, improved project instructions, and more guidance on digital tools. Several students also recommended more practical components, simplified assignments, and opportunities to get to know peers earlier to support smoother collaboration.

The **Digital Health Module** demonstrated a notable **increase** in students’ digital health competencies. Before the module, over 70% of students reported limited knowledge, with 33.3% knowing nothing and 40% unable to apply their knowledge independently. After completing the module, 86.7% indicated improved skills, with 60% able to apply knowledge in familiar situations and 26.7% able to apply it independently and adapt it to new contexts.



Source: Assessment of the eSleep\_dHealth OERs survey

**Graphic 4 Digital Health Module - knowledge/skills before and after**

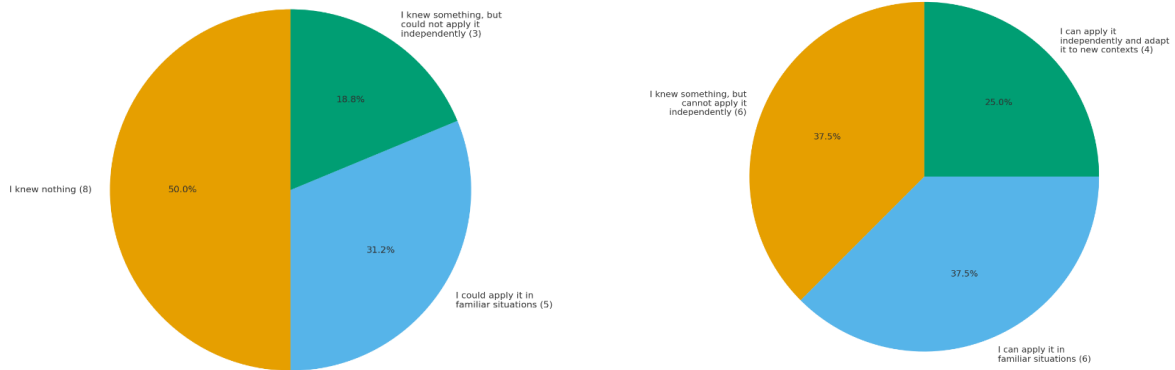
The **quality and clarity of educational materials** received mixed but generally positive ratings, with 35.7% rating them as good and 50% as acceptable. Moreover, two-thirds of students (66.7%) stated that the module helped them understand how digital tools support sleep medicine moderately to extremely, with 40% rating their understanding as “very.”

Students valued learning about the potential of digital tools in healthcare, the interesting and updated content, lectures and videos, and the inspiration to further explore digital health. Insights from other countries and teamwork were also seen as beneficial.

Suggestions for improvement focused on clearer instructions, simplifying tasks and terminology for students without IT backgrounds, and providing more guidance and examples on using digital tools and completing assignments.

The **Entrepreneurship Module (excluding the First Learning Expedition)** showed a significant shift from very low to moderate levels of knowledge and skills in entrepreneurship and

innovation. Before the module, half of the students (50%) reported knowing nothing about the topic, and another 18.8% could not apply their knowledge independently. After completing the module, 37.5% indicated they could apply their knowledge in familiar situations, and 25% could apply it independently and adapt to new contexts, showing clear learning progress despite the challenging subject matter.



Source: Assessment of the eSleep\_dHealth OERs survey

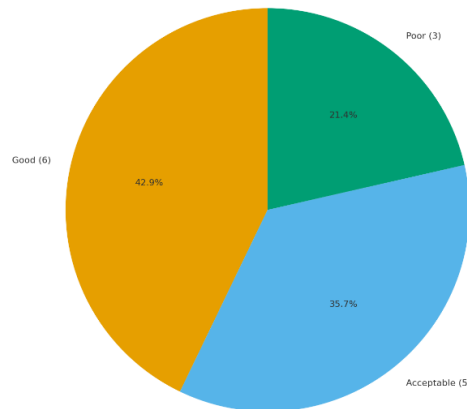
**Graphic 5 Entrepreneurship Module -  
knowledge/skills before and after**

The **quality and clarity of educational materials** received mixed feedback, with the majority rating them as acceptable (56.2%), 18.8% as good, and 25% as poor, suggesting room for improvement in structure and clarity.

Students particularly appreciated being introduced to entrepreneurship concepts, hands-on tasks, teamwork, and innovation tools such as the design sprint method. Many noted that learning how to prototype and test simple concepts was eye-opening and useful.

Suggestions for improvement focused on adapting the content for students without a business background, simplifying and clarifying instructions, providing more relevant examples for healthcare, and ensuring better task planning and equal group participation. Many medical students highlighted the challenge of entering an unfamiliar “business” domain, indicating the need for clearer scaffolding and contextualization.

The **First Learning Expedition** received generally positive feedback, with most students rating their overall experience as good (42.9%) or acceptable (35.7%), and a smaller proportion rating it as excellent. This indicates that the majority of participants had a constructive and engaging learning experience, though there remains room for refinement.



Source: Assessment of the eSleep\_dHealth OERs survey

**Graphic 6 First Learning Expedition - experience**

In terms of applying entrepreneurial methods, 78.6% of students rated **the seminars, workshops, and assignments** as moderately to very useful, highlighting the value of practical, hands-on learning. Similarly, 71.4% reported that the **practical activities** helped them better understand innovation and design in digital health and sleep medicine, with many noting that structured steps and real-world application strengthened their comprehension.

**Teamwork** was another central aspect of the Learning Expedition. Most students rated their team experience as good (42.9%) or very good (28.6%), with 57.1% finding team communication effective or very effective. **Task distribution and collaboration** were rated as happening occasionally to most of the time by 85.8%, indicating that while collaboration was generally positive, some teams experienced uneven workload distribution. Additionally, 71.5% reported that the experience moderately to very significantly improved their teamwork and collaboration skills.

**Working in an international and interdisciplinary environment** was viewed particularly positively – 78.6% found it enjoyable or very enjoyable and enriching. Students highlighted teamwork, communication, creative thinking, structured problem-solving, and insights into interdisciplinary collaboration as the most valuable outcomes.

Suggestions for improvement focused on reducing the intensity and length of daily assignments, shortening seminars and workshops, and providing clearer, more accessible instructions, especially for students without a business background. Several participants also recommended better task distribution within teams and more guidance on simplifying prototypes and using entrepreneurship concepts, ensuring that all disciplines can engage meaningfully.



## 4 Conclusion

The assessment of the eSleep\_dHealth course provides valuable insights into the effectiveness of its modules and activities in equipping students with knowledge and skills in sleep medicine, digital health, and entrepreneurship. Overall, students reported increased competencies, especially in applying theoretical knowledge to real-world challenges and collaborating in international, interdisciplinary teams.

The findings highlight both the strengths of the programme – such as the quality of learning materials, the relevance of content, and the impact of practical activities – and areas for further improvement, including clearer instructions, more structured assignments, and additional support for students with limited prior knowledge in entrepreneurship or digital tools.

These results not only confirm the programme's success in fostering social innovation skills but also provide a solid foundation for future improvements and recommendations to enhance the learning experience and impact in subsequent implementations.