# Pilot Course Curriculum and Intervention Plan for Fantastic Data (UiB)

## "Improving the quality and sustainability of learning using early intervention methods based on learning analytics"

### Project No. 2023-1-FI01-KA220-HED-000159757

| | |
|---|---|
| **Project ref. number** | 2023-1-FI01-KA220-HED-000159757 |
| **Project title** | **ISILA - Improving the quality and sustainability of learning using early intervention methods based on learning analytics** |
| **Document title** | Pilot Course Curriculum and Intervention Plan for Fantastic Data (UiB) |
| **Document Type** | Report |
| **Document version** | 1.0.0 |
| **Previous version(s)** | |
| **Planned date of delivery** | January 2025 |
| **Language** | English |
| **Dissemination level** | Public |
| **Number of pages** | 9 |
| **Partner responsible** | Belgrade Metropolitan University (BMU) |
| **Author(s)** | Fredrik Sundt Breien, Sofie Steinsund, Jelena Jovanovic |
| **With contributions by:** | Barbara Wasson |
| **Revised by:** | Sonsoles López-Pernas, UEF |

# Table of Content

# 1 General course information

| Course name | DIGI110: Fantastic data |
|---|---|
| Institution | University of Bergen (UiB) |
| Course level | Undergraduate |
| Teaching model | Online |
| Course learning objectives | The goal of the course is to give participants basic knowledge of what data and digitalization do to us and the society we are a part of, what kind of technology is behind it, and what one can do to get a hand on the wheel.<br><br>Participants will also acquire the necessary basic skills to perform critical thinking about the roles of data in society. |

# 2 Motivation and purpose (Why)

| Goal of the inquiry | |
|---|---|
| **What do you want to learn about the teaching and learning process?** | The overall objective is to obtain insights into students' engagement with online learning materials, and how this engagement associates with students' learning outcomes. In particular, the aim is to answer questions such as:<br><br>- How engaged are the students with course readings (Datareisen and extra material)?<br><br>- How regular and how successful are the students in completing the course assessments (quizzes and assignments)?<br><br>- What course materials are most visited / used by the students? And what course materials receive less students' attention?<br><br>- Is there an association between the use of distinct online course materials and the students' course performance?<br><br>- How successful are the students in regulating their learning in this course?<br><br>- How motivated and interested are the students for the course topics?<br><br>- How well do students regulate their effort and time devoted to this course? |

# 3 Defining more precisely what to explore (What)

| Specific questions of interest | |
|---|---|
| **Key inquiry questions** | How frequently do they access course materials? How regular are they in completing the (obligatory and optional) readings and (formative and summative) tasks and quizzes? |
| | If / How do the students' interaction with online course materials change over time? |
| | What course materials receive more / less students' attention? Do students engage with optional readings? |
| | Which course materials may require revisions / improvements to be more comprehensible / useful to the students? |
| | Is regular engagement with distinct online course materials associated with better course performance (quiz scores and passed assignments)? |
| | If / How the students' motivation change throughout the course? |
| | How successful the students are in regulating their learning time and effort throughout the course? |
| | How successful the students are in self-regulating (planning, monitoring, adjusting) learning throughout the course? |
| **Data sources** | Data logged by Canvas LMS, including logs of students engagement with course activities, assignment submissions, and the like. |
| | Engagement data logged by the Datareisen, the tool used in the course as the main source of the course materials. This includes data about students' access to reading materials and completion of formative and summative quizzes. |
| | Survey data about different aspects of students' self-regulated learning (time management, effort regulation, motivation, etc.) |

# 4  Data collection strategy (How)

<table>
<tr>
<td rowspan="4"><strong>Data sources</strong></td>
<td>Canvas, the LMS used in the course as the main learning platform</td>
</tr>
<tr>
<td>Datareisen, an online learning tool offering access to course materials (readings and quizzes)</td>
</tr>
<tr>
<td>Concise SRL survey, weekly survey administered through Canvas</td>
</tr>
<tr>
<td>Students will be asked to give their informed consent for the use of the collected data, using Informed consent form prepared for the ISILA project. If a student does not consent to the data use, the data of that student will <strong><em>not</em></strong> be used for any data analyses.</td>
</tr>
<tr>
<td><strong>Data aggregation</strong></td>
<td>Data will be collected in xAPI format and integrated into Learning Locker using custom xAPI mappings developed within the ISILA project</td>
</tr>
</table>

**Detailed methods for data collection**

| Week# | Topic | Learning activities and materials | Data source(s) and collection method(s) |
|---|---|---|---|
| 1 | What is Data? | Datareisen, Chapter 1, Part 1: "Why Should I Care About Data?"<br><br>Additional readings<br><br>Assignment 1 "We are data"<br><br>Quiz 1 "What is data" | Engagement data logged by Datareisen<br><br>Engagement data logged by Canvas<br><br>SRL survey |
| 2 | What kinds of data do I create? | Datareisen, Chapter 1, Part 2: "What Kind of Data Am I Creating—And What Happens to It?"<br><br>Additional readings<br><br>Assignment 2 "Data iceberg"<br><br>Quiz 2 "What kinds of data do I create?" | Engagement data logged by Datareisen<br><br>Engagement data logged by Canvas<br><br>SRL survey |
| 3 | By whom and how is data used? | Datareisen, Chapter 1, Part 3: "What Challenges and | Engagement data logged by Datareisen |

| | | | |
|---|---|---|---|
| | | Opportunities Does Data Provide?"<br><br>Additional readings<br><br>Assignment 3 "Data use"<br><br>Quiz 3 "Use of data!" | Engagement data logged by Canvas<br><br>SRL survey |
| 4 | Data processing and communication | Datareisen, Chapter 2, Part 1: "How Does Data, Computers and Programming Work?"<br><br>Datareisen, Chapter 2, Part 2: "What Technologies is Data Dependent On?"<br><br>Additional readings<br><br>Assignment 4 "Data representation (ASCII)"<br><br>Quiz 4 "Data management and data communication" | Engagement data logged by Datareisen<br><br>Engagement data logged by Canvas<br><br>SRL survey |
| 5 | Technologies that use data and data security | Datareisen, Chapter 2, Part 3: "... And Which Technologies Depend on Data?"<br><br>Datareisen, Chapter 2, Part 4: "How Do We Secure Our Data and Computer Systems?"<br><br>Additional readings<br><br>Assignment 5 "Technologies that use data"<br><br>Quiz 5 "Technologies that use data and data related security" | Engagement data logged by Datareisen<br><br>Engagement data logged by Canvas<br><br>SRL survey |
| 6 | Data categorisation, data collection and privacy regulations | Datareisen, Chapter 3: "How We Get a Hold of Data?"<br><br>Additional readings<br><br>Quiz 6 "Data categorization, data collection, and privacy regulations" | Engagement data logged by Datareisen<br><br>Engagement data logged by Canvas<br><br>SRL survey |
| 7 | Course summary and evaluation | | Engagement data logged by Canvas |

# 5 Data analysis and interpretation (So What)

| | |
|---|---|
| **Sense making and interpretation context** | The data collected and stored in the UiB's Learning Locker instance, will be visually explored in order to identify patterns in the data, which may be indicative of a need for intervention. In particular, dashboards will be used to visually explore and analyze:<br><br>- The level and dynamics of students' engagement with distinct course materials, both obligatory ones (content in Datareisen) and optional ones (additional readings)<br><br>- How easy / difficult distinct assessments are for students (based on the number of attempts and incorrect responses)<br><br>- The patterns in accessing readings and formative tasks and quizzes, as these may indicate learning strategies adopted by students<br><br>- Correlations between the level of engagement with distinct course materials and learning outcomes (assessment scores)<br><br>- The dynamics of the students' motivation, effort, time management, and other aspects of self-regulation of learning throughout the course |

# 6 Interventions plan (Now What)

| | |
|---|---|
| **Potential interventions** | Intervention strategies that will be considered include:<br><br>- Face-to-face interventions in the form of online consultations with either individual students or groups of students whose patterns of interaction with learning materials suggest significantly lower engagement compared to the overall cohort or form of engagement not aligned with the course design and/or objectives. Such interventions (consultations) may include talking to students to understand any issues they may be facing with the course; suggesting / arranging additional / different learning activities; offering direct help (e.g., explanations) regarding particular course topics, etc.<br><br>- Internet-based interventions oriented to many / all students in the cohort, in case low engagement with certain course materials or misunderstanding of certain course topics are detected. These interventions may take the form of email reminders, motivational messages, and/or recommendations of additional / alternative learning resources.<br><br>- Revision of learning materials that received low engagement. This may include, for example, adding more / |

| | |
|---|---|
| | different additional reading materials, offering the same topic in different modalities (e.g., video tutorials or podcasts), etc.<br><br>- Rethinking of the course design and considering potential changes for the following course edition |