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People, Partnerships and Pedagogies

Collaborative approach in the programme design and development – A case study in a Postgraduate Certificate in Computer and Information Sciences

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Pandemics and natural disasters and advancements in technologies like generative AI require universities to stay nimble and responsive to adjust at short notice. This paper investigates collaboration across disciplines and departments within a university in designing and developing courses to respond to the rapidly changing context in higher education during the early phase of COVID-19 pandemic. More specifically, in this paper we reflect on a collaborative approach in programme design and development of the online Postgraduate Certificate (PGCert) in Computer and Information Sciences Programme.
Using a qualitative research approach and adopting a case study methodology, this paper outlines the nature of collaboration, the planned data collection methods, and preliminary findings. This work demonstrates the benefits of collaborative approaches, including increased efficiency through teamwork, a balanced distribution of individual and collaborative tasks for staff, and the creation of a supportive and motivating social environment.

Keywords: Course, programme, design, development, partnership, collaboration, university

Introduction

In the face of numerous unprecedented global events, such as the ongoing pandemic and natural disasters, the world is witnessing a rapid evolution of technologies, including the remarkable development of generative AI. As a result, educational programs offered by universities must quickly adapt and transform to cater to the demands of the ever-changing landscape. To ensure their courses remain current and aligned with the rapidly evolving context, universities are compelled to seek effective and efficient approaches to course design and development. This paper reflects on the potential of a collaborative approach in the design and development of educational programmes. By adopting a collaborative approach, universities can address the pressing demand for up-to-date courses that meet the needs of the fast-paced and dynamic educational environment.

Programme design and development is a complex process that requires a multidisciplinary and collaborative approach. This approach can bring together stakeholders (e.g., learning designers, learning technologists, and academics) from multiple disciplines and backgrounds to create a shared vision, goals, and strategies for achieving them. By involving a range of perspectives and experiences in the programme development process, a collaborative approach can be more effective and sustainable. As higher education institutions are increasingly teaming up learning designers and learning technologists with teaching academics to transform their courses, the collaboration/partnerships have been gaining research attention (Halupa, 2019; Milman & Watkins, 2021; Mueller et al., 2022; Tay et al., 2023).

Learning designers collaborating with academics and other stakeholders promotes critical thinking about students, alternative learning environments, accessibility, and the use of information technologies (Campbell et al., 2009). Learning designers play a crucial role in shaping the agendas for change in interpersonal, institutional, and societal contexts through a reflective and critical approach and interpersonal agency. Consequently, learning design should be considered as a socially constructed practice for design purposes.

Developing a collaborative relationship requires a combined effort from all team members. A collaborative relationship in course design and development "is not only cordial, but also fluid, complicated and contentious at times" (Mueller et al., 2022, p. 578). Typical issues such as changes, design and development, collaborative conflicts, and pedagogical and communication conflicts can hinder the relationship and work (Mueller et al., 2022). However, if conflicts are managed well, they can have a positive impact on workplace productivity and foster stronger relationships (Tjosvold, 2008).

To cultivate successful and productive collaborations, learning designers must facilitate teamwork to build trust, understanding and open communication (Mueller et al., 2022). To foster interdisciplinary collaborations, several approaches can be employed, such as cultivating a shared vision, minimizing the use of specialized terminology, and incorporating prompts and sufficient time for clarification (Chen & Kleinheksel, 2021).

The degree of collaboration is determined by the extent of course development and revision needed, the pre-existing relationship among team members, and the level of expertise of teaching academics (Chao et al., 2010). Bawa & Watson (2017) conducted a study to explore stakeholders' viewpoints regarding the essential characteristics of successful collaboration in instructional design projects. Communication, humility, adaptability, mentorship, empathy, engagement, and networking are considered fundamental to effective collaboration. Richardson et al. (2019) delineated essential factors contributing to a successful collaboration, including understanding the role of educational designers, establishing trust, obtaining administrative support, and securing academic buy-in. It is argued that constructing trust-based relationships within the team is one of the most critical factors in successfully implementing technologies into education (van Leusen et al., 2016).

This paper reflects on the partnership/collaboration between a senior learning designer, a learning technologist, a program leader and academic staff in designing and developing courses for a Postgraduate Certificate in Computer and Information Sciences. While each member only has some specific skills to design and develop the courses, this team bring together individual member's expertise, skillset, rich experience and background to the project. During a systematic learning design process, the collaboration and discussion utilised the wealth of pooled expertise, skillsets, and experiences, and transform these into a collective team capability in the design and development of the courses composing the postgraduate programme.

Research method

This case study focuses on a large postgraduate certificate programme in Computer and Information Sciences. In the current study we, as the authors of this paper, reflect on the collaboration in the design and development of the courses in the Postgraduate Certificate in Computer and Information Sciences Programme, which is offered entirely online. The collaborative team was created among a diverse set of professionals in the area of learning design, learning technology, academic staff, and management.

In the context of this project, the goals of this study are: (1) To reflect on the collaboration between partners in various roles across disciplines and departments within the institution; (2) To draw valuable implications that can benefit future work and the work in similar contexts. Based on these research goals, the research questions were designed and specified as below.

Research questions:

1. What is the nature of the collaboration in the design and development of the Postgraduate Certificate in Computer and Information Sciences project?
2. What were the initial results?

Participants and data collection methods

Participants in this case study are partners, and the authors of this paper, who took part in designing and developing the online programme, as shown in Table 1.

Table 1: Participants

Participant type	Number
Teaching academics	4
Programme leader	1
Senior Learning Designer	1

The research focuses on reflective analysis and personal insights by the authors, with no external participants engaged in this study. The need for formal ethics application did not arise, as the study predominantly involves the authors' reflection, rather than direct reporting of students' feedback or external insights. As per the institution's ethics guide, it does not require an ethics approval.

In order to answer the research questions and uncover rich and insightful findings, the chosen methods for data collection were critical self-reflections provided by the authors and documentation. The following prompts guided our reflections:

1. What is your name and your role?
2. How long have you been teaching/working at university? Please tell us a bit about your teaching practice and experience.
3. Have you participated in a collaborative course development project before this project? If yes, please tell us about the project(s)? How did you get involved in this project?
4. What benefits did this way of working and the collaboration bring to you?
5. What were the key challenges that you faced during the PGCert development?
6. What advice would you give your colleagues about participating in a similar collaborative project?
7. Were there any learnings from this project that have shaped your teaching practice after the project ended?
8. Anything else that you'd like to add.

Documents and resources to support this study include weekly workshop materials and meeting notes, course plans, action plans, course descriptors, and course materials in an LMS.

A story of partnership in the development of a Postgraduate Certificate in Computer and Information Sciences

The goal of the project was to design and develop the postgraduate certificate programme in Computer and Information Sciences. The scope of the project is:

- Pedagogical intentions in the design and the course materials are ensured.
- Courses are delivered online.
- Course materials are completed.
- Assessments fit for purpose.
- The courses are fully developed in the LMS.
- Consistency between courses within the programme is ensured.

This programme was offered fully online. To complete the certificate, students need to study four courses (60 points). The design and development project focuses on four courses of the programme: Neuroinformatics, Data Mining and Machine Learning, Text Mining, and Deep Learning.

Neuroinformatics (15 points) introduces students to contemporary development and the necessary skills to understand and analyse the vast amount of Neuroinformatics (NI) data and information. These include relevant databases, ontologies, brain atlases, EEG, fMRI and other data, computational modelling techniques, brain-computer interfaces, and neuromorphic computation. The course is interdisciplinary and suitable for students from the information and computer sciences, engineering, environmental and health sciences, cognitive science, neuroeconomics, art and design, and sport.

In Data Mining and Machine Learning (15 points), students study and evaluate data mining techniques such as Decision Tree classifiers, Bayesian classifiers, Apriori techniques for discovering associations between features, clustering algorithms, and neural network technology. They critically analyse the link between traditional statistical analysis and data mining. Students also critically appraisal two major schemes, identifying their strengths and weaknesses to assess their suitability in a real-world context.

Text Mining (15 points) explores the issues associated with the processing of knowledge represented by natural

languages using a computer. Discourse is analyzed for text structure, segmentation, cohesion/coherence and reference resolution. Text processing tasks such as document summarization, inter-language translations, and information extraction will be examined. The use of text mining for a variety of applications are examined as case studies.

Deep Learning (15 points) emphasises on the implementation of AI approaches and AI-based methodologies to a range of problems in different industry sectors. Successful deep learning design, relevant algorithms, and tools are proposed and justified. Studies at the research frontiers of deep learning, especially quantitative evaluation of deep neural networks, are analysed and critiqued.

Team members – Partners

Our team consisted of academic and professional staff. A senior learning designer coordinated the collaborative project with the support of a learning technologist. From the academic side, four teaching academics participated in the project, who were led by their programme leader. The course design and development process covered ten weeks and followed four stages: Set up and review (2 weeks), plan and design (4 weeks), produce and review (6 weeks), and closure (1 week) (Table 2). The stages overlapped with each other, and evaluation and iteration were built-in in each stage.

Table 2: Project stages

Stages	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10
Set up and review										
Plan and design										
Produce and review										
Closure										

The project team met weekly to discuss and review the work, make decisions, update the progress of the work, and agree on the next steps. In the Set up and Review, the project team met to get to know each other, established the shared goals, and discussed and agreed on the timeline and the deliverables. In the meetings, the senior learning designer provided training for the team on important knowledge and skills for learning design in the context of the project. The training covered constructive alignment, considerations when writing learning outcomes, and using action verbs in learning outcomes, revised Blooms' taxonomy, and backward design. The senior learning designer facilitated the discussion on reviewing current teaching and learning. The discussion focused on two questions: (1) What is working well? (2) What areas should be improved? The review holistically examined the seven areas: Learning outcomes, teaching & learning approach, learning activities, assessment & feedback, content, use of technologies, and virtual learning environment (Figure 1). The team worked on the action plans, which had been put in an online Teams folder as shown in Figure 2. The meeting was concluded with the to-do list which would be completed before the meeting next week. The first week's to-do list included two items: (1) Complete the action plan; (2) Collate programme and course information and resources, and upload these to the Teams folder. During the ten weeks, the project team met each week, and the weekly meeting had similar formats to the first meeting.

It is important to note that all documents in this project were put in the online shared Teams folder, and team members worked on the online documents. All team members had full Edit access to the documents. They collaborated and co-authored these documents. This sharing helped to ensure transparency. Team members could know where everyone was at, collaborate, co-construct the design of the courses, and learn from each other.

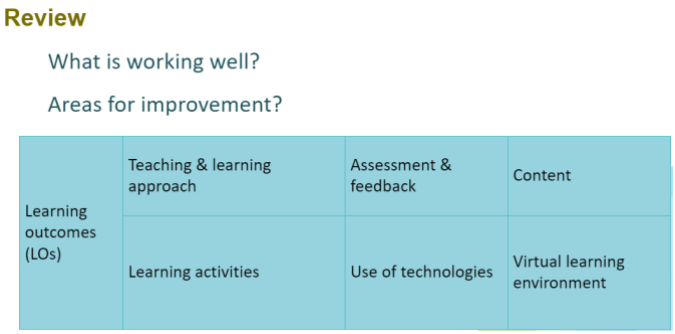


Figure 1: PowerPoint slide for discussion on the review

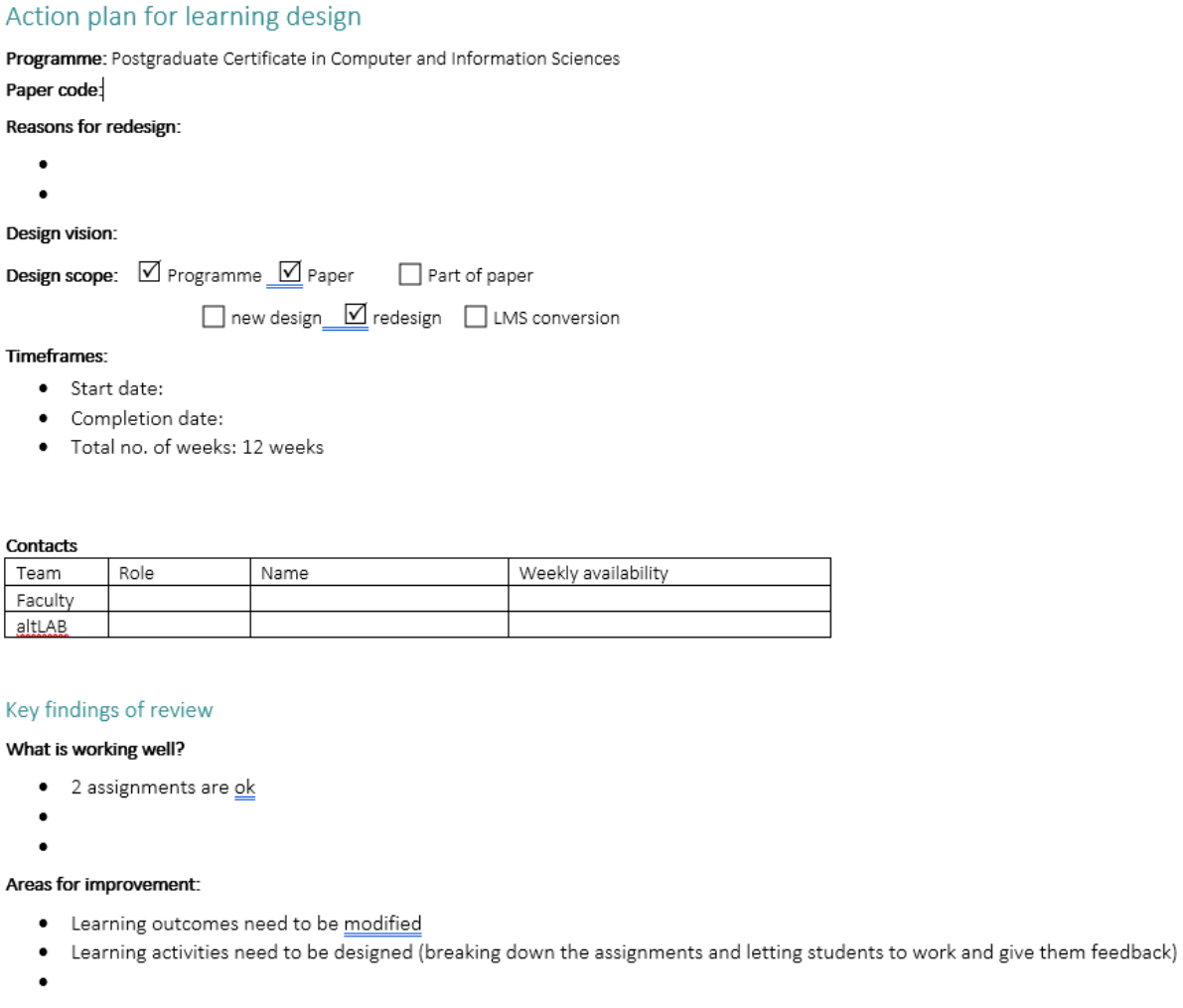


Figure 2: Action plan

In the Plan and Design stage, the team mapped out high-level overviews of the courses, revised courses learning outcomes, and outlined the topics, learning activities, assessments and feedback. Design ideas of the courses and links between courses were shared, discussed, revised, and enhanced during this stage. The products of this stage were the course plans.

In the Produce and Review stage, the learning technologist prototyped a week/session of learning in the learning management system (LMS). The team reviewed the prototype together, gave inputs, discussed, and revised the prototypes. The learning technologist then developed the courses in the LMS; introduction videos were recorded. A few weeks/sessions were developed at a time so that the team had opportunities to give feedback.

Iterations were made and carried over to the next slots of weeks/sessions. Assessments and feedback strategies were also designed and developed. The learning technologist, with the support of her team, provided training for the academics on how to work with the LMS, Panopto, and H5P. The products of this stage were the courses in the LMS.

At the Closure stage, the team presented the courses in the final meeting. The team discussed reflection on the way of working and the work on the projects. We celebrated the success of the project with a chocolate mud cake.

Preliminary results

The project was completed successfully within the timeframe. At the end of this project, four online courses in the programme and the course plans were designed and developed. The home pages of the courses are presented in Figure 3 and Figure 4. On a home page, students can see an overview of the weeks, topics of each week/lecture and learning outcomes of each lecture. When students click on one of the tiles, they will go to a content page for the week. A weekly content page often contains topics covered in the week, learning outcomes for the week, and a to-do list for students. The Week 2 content page of the Neuroinformatics course is presented in Figure 5 as an example of a weekly content page. During the project, scaffolding learning tasks that support students in their assessments were developed. An example of a scaffolding task is shown in Figure 6.

Some screenshots of the courses are presented in Figures 3, 4, 5 & 6.

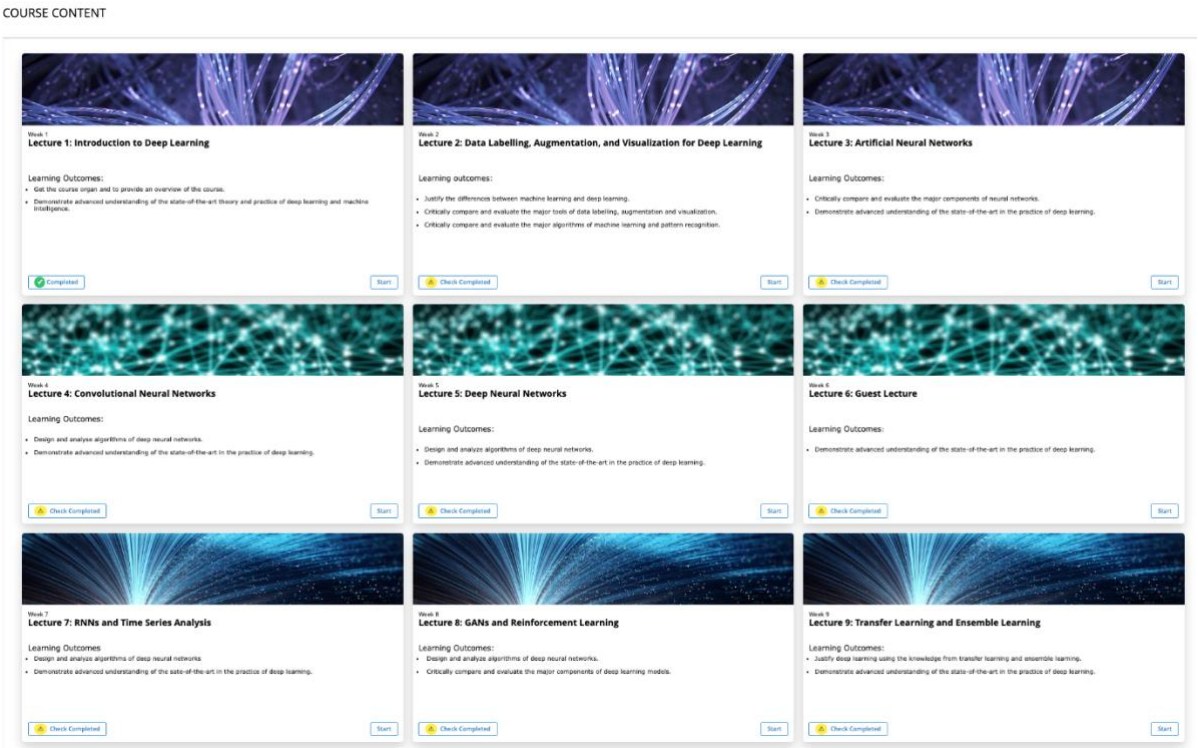


Figure 3: Home page of the Deep Learning course

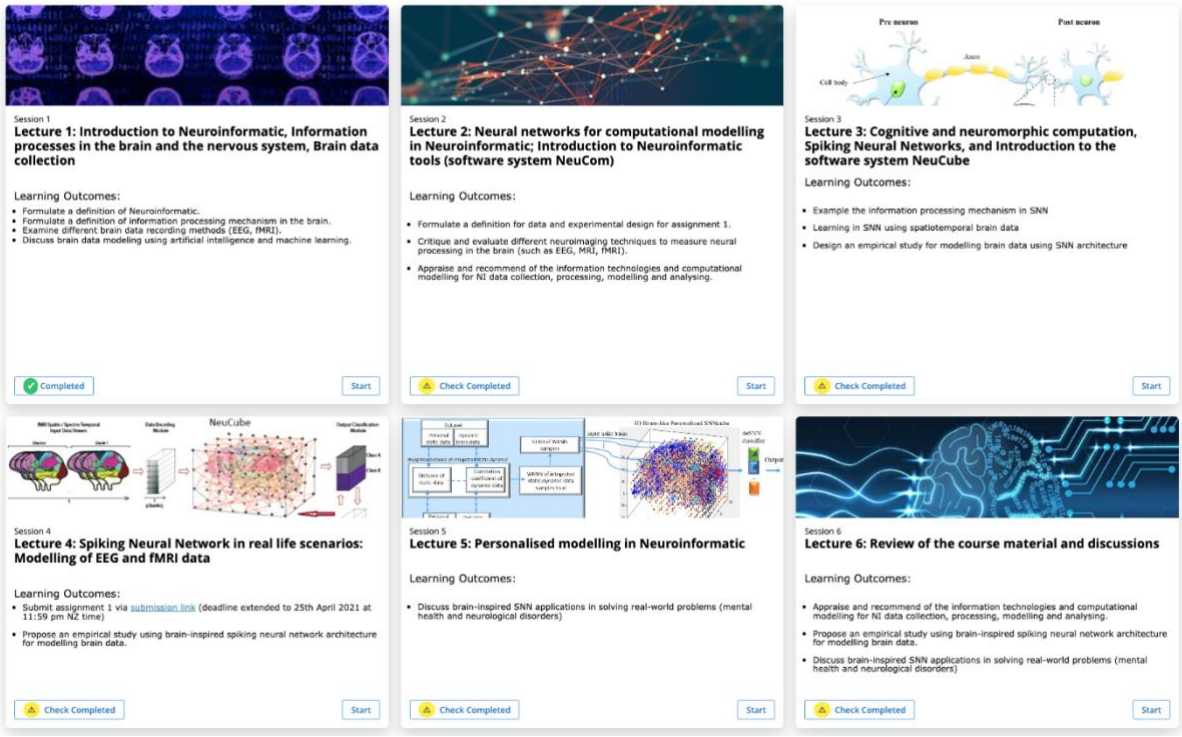


Figure 4: Home page of the Neuroinformatics course

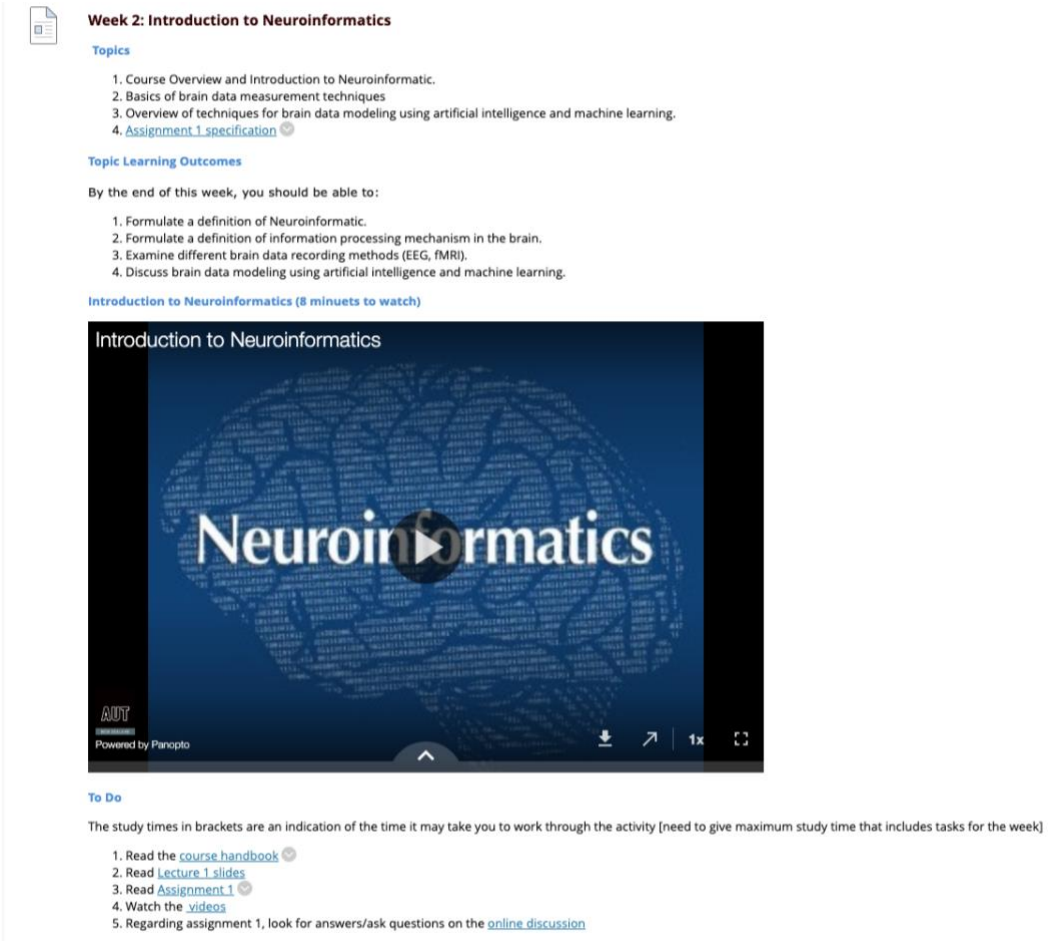
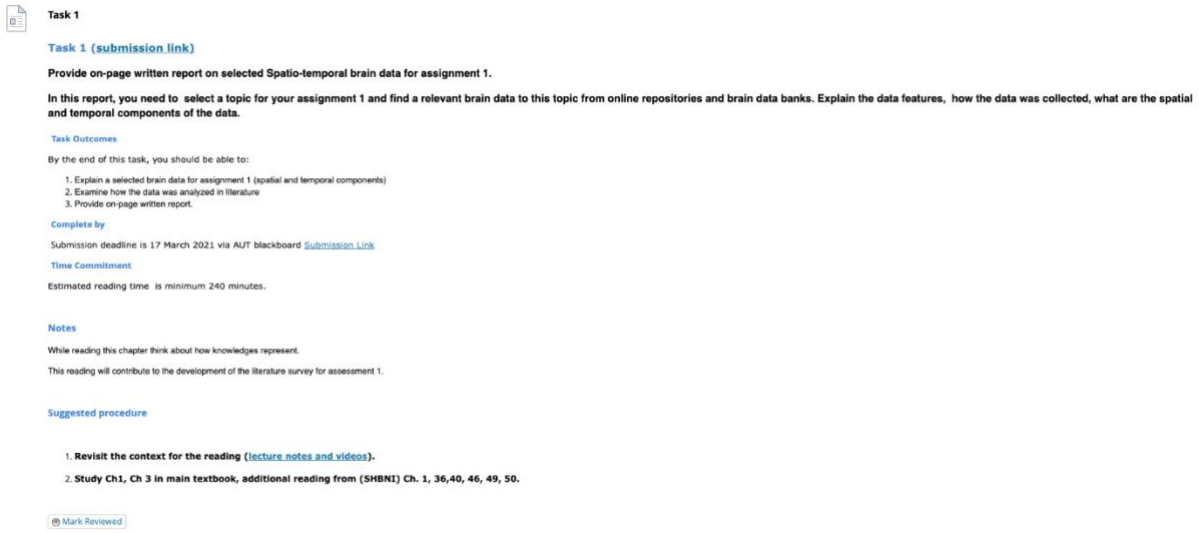


Figure 5: Week 2 of the Neuroinformatics course



Task 1

Task 1 (submission link)

Provide on-page written report on selected Spatio-temporal brain data for assignment 1.

In this report, you need to select a topic for your assignment 1 and find a relevant brain data to this topic from online repositories and brain data banks. Explain the data features, how the data was collected, what are the spatial and temporal components of the data.

Task Outcomes

By the end of this task, you should be able to:

1. Explain a selected brain data for assignment 1 (spatial and temporal components)
2. Examine how the data was analyzed in literature
3. Provide on-page written report.

Complete by

Submission deadline is 17 March 2021 via AUT blackboard Submission Link

Time Commitment

Estimated reading time is minimum 240 minutes.

Notes

While reading this chapter think about how knowledges represent.

This reading will contribute to the development of the literature survey for assessment 1.

Suggested procedure

1. **Revisit the context for the reading (lecture notes and videos).**
2. **Study Ch1, Ch 3 in main textbook, additional reading from (SHBNI) Ch. 1, 36,40, 46, 49, 50.**

Mark Reviewed

Figure 6: A task in the Neuroinformatics course

The collaborative approach used to design and develop the online Postgraduate Certificate in Computer and Information Sciences offers numerous benefits. Firstly, it harnesses a team's wealth of expertise, skillsets, and experiences. By engaging in systematic collaboration and discussions, the diverse perspectives and knowledge of individuals are pooled together, resulting in a collective team amalgamation that possesses a superpower in course design and development. This collaborative process enables the team to tap into a broad range of expertise, insights and innovative ideas, leading to the creation of more robust and effective courses. Each team member brings their unique expertise, contributing to the overall quality and richness of the programme design. Collaborative approaches foster a sense of ownership and shared responsibility, as team members work together towards a common goal. This synergy not only enhances the final output but also promotes professional growth, learning, and continuous improvement within the team. Overall, a collaborative programme design and development approach maximises the collective capabilities of the team.

Secondly, the collaborative approach to programme design and development ensured that the programme was effective in achieving its goals. By involving diverse perspectives and experiences in the planning process, programme designers were able to anticipate challenges and develop strategies to overcome them. This helped to prevent problems from arising during implementation and ensured that the programme was effective in achieving its goals.

Thirdly, the collaborative approach to programme design and development helped to build trust and foster positive relationships between the partners. By involving the partners in every stage of the programme design and development process, from planning to evaluation, relationships based on mutual respect and trust were built.

Conclusion

The case study of a collaborative approach to programme design and development in a Postgraduate Certificate programme in Computer and Information Sciences demonstrates the value of involving diverse perspectives and experiences in the development process. This approach can lead to more effective, sustainable, and responsive programmes. While there are challenges associated with a collaborative approach, the benefits of involving the stakeholders in every stage of the programme development process often outweigh the costs. As such, collaborative programme design and development should be considered as a valuable tool for creating positive change.

The study acknowledges limitations such as the absence of student data. Further data collection and analysis will be conducted in future study. Overall, the project contributes to understanding the value of collaborative approaches in design and development, offering insights into effective strategies for enhancing course quality and responsiveness in a rapidly changing educational landscape. Invaluable experience, templates and resources,

which were developed from this project, were used to feed into a large-scale project around learning management system transition in the same institution, and contributed to the success of that project.

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