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| **COURSEWORK COVER PAGE** | |
| **Module Number:** | LD7119 |
| **Module Title:** | Engineering and Environment Advanced Practice London Campus Consultancy Project |
| **Module Tutor Name:** | Nitsa Herzog [NH] |
| **Coursework Title:** | Component 2 - Individual Assignment |
| **Word count:** | 2200 |
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| **Assignment Group:** | 2 |
| **Programme of Study:** | MSc Big Data & Data Science Technology [BD] |

**Submission Instructions**

1. Name your submission in according to the name convention, <module number>\_<tutor initial>\_< prog code>\_<assignment group>\_<your id><first name>.docx, eg LD7119\_NT\_BD\_A\_w22012345John.docx is the LD7119 assignment submitted from a group A student enrolled in MSc Big Data & Data Sciences, attending Ning Tse’s session.
2. Submit to Final Submission Link (Individual Tasks) on Bb **before 16:00, 15 Jan 2025**

**Declaration**

*I confirm that this assessment is my own work and that I have duly acknowledged and correctly referenced the work of others. I am aware of and understand that any breaches to the Code of Academic Conduct will be investigated and sanctioned in accordance with the Academic Conduct Regulation.*

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**Section 1 - Progress Report**

**1.1. Introduction to the Group Project**

The progress report for the module attends to the crafting of competencies, the development of group projects, and the application of theoretical knowledge to genuine contexts.

The undertaking examines the kind of society and educational atmosphere in which students at Northumbria University live and learn. It aspires to uncover what kinds of difficulties students face—that is, not just individuals but also various groups—and to propose on the basis of that investigation solutions that are backed by evidence.

An organized methodology, encompassing the reliable activities of survey distribution, data collection, and analysis, created a pathway to outcomes that ensured reliability but also fostered the kinds of activities one would wish to see in a high-functioning group: critical thinking, problem-solving, and adaptability.

The initial brainstorming meetings ensured that the objectives were well defined. This allowed the group to take on parts of the project in parallel and to work fairly seamlessly in spite of several challenges.

**1.2. Key Themes and Objectives**

Our main aim was to tackle the difficulties that students encounter in their academic and social environments. This meant pinpointing what hampered them from achieving academic success, finding what was in the way of their clear path to essential support services, and working to build an inclusive community that made all students feel at home in the university. The key themes of the project included:

• Understanding student experiences through efficient data gathering and analysis.

• Improving the ways in which the group communicates and collaborates.

• Following research ethics.

• Advocating for inclusivity and cultural diplomacy.

The project highlighted the significance of cultural sensitivity, as team members worked together across various cultural backgrounds (Brown, 2021). This diversity was a boon for creativity and provided a rounded appearance to our corporate problem-solving.

**1.3. Skills Development and Application**

The group project allowed for the development of technical and interpersonal skills. The group gained experience in survey design, statistical analysis, and data visualization. They were "asked to analyse the relationship between two items using a statistical method of their choosing." Most of the group used Excel and Python to process and analyse the data. Along with the technical challenges provided by the project, interpersonal skills like communication, teamwork, and conflict resolution were equally critical to the project's success (Johnson & Smith, 2019).

The project timeline and task delegation were managed well due to strong leadership skills. "We established regular meetings and progress reviews to maintain accountability and transparency," a team member said. "We had active listening and mutual respect among team members, which created a positive working environment."

Furthermore, the initiative enabled participants to improve their critical thinking and decision-making skills. They were often faced with situations that demanded rapid resolution of problems, and these instances became teachable moments for all of us.

**1.4. Challenges Encountered and Overcome**

The project presented the group with a number of difficult problems that had to be solved. First among these was the problem of schedule coordination. Even though the team was relatively small, it took a lot of work to find common meeting times and to ensure that updates were given in a timely fashion. When the group did manage to meet, it was necessary to work at top speed just to keep from falling behind. And falling behind was a real danger, because the next challenge presented was the problem of achieving sufficient project-related communication.

The group took the following approaches to meet these challenges:

- Created shared digital workspaces.

- Set deadlines for task completion.

- Fostered an open communication culture.

These workshops ensured that regular check-ins and collaborative problem-solving took place to maintain a smooth workflow. If roadblocks were encountered, they were dealt with before causing any significant delays. (Griffiths, 2021)

Managing group dynamics, particularly when oppositional opinions surfaced, was another major hurdle to overcome. When the team encountered conflict, resolution strategies, such as mediated discussions and reminders of shared objectives, helped the team realign and remain productive.

**1.5. Cultural and Ethical Awareness**

The project highlighted the significance of ethical considerations and cultural awareness in research. Team members hailed from an array of cultural backgrounds, which enhanced our conversations and led to problem-solving that was often, and very delightfully, out of the box. One of our primary goals was to respect everyone's cultural background and to create an environment that was truly inclusive.

All ethical principles—such as the ones that govern data confidentiality and informed consent—were adhered to throughout the project. All participants in our study were fully informed about the study's purpose and were assured that their responses would remain anonymous.

Moreover, building trust with survey participants was contingent on cultural sensitivity. Survey team members worked diligently to ensure that the actual survey questions were neutral, unbiased, and culturally suitable—minimizing the risk that participants would misinterpret them.

**1.6. Outcomes and Lessons Learned**

The project outcome displayed the significance of collaboration, adaptability, and resilience. The team collected and assessed data, recognized vital trends, and put forth recommendations that could practically be applied to improve the student experience. What stands out is not just the technical skills involved. The project had a lot to teach about the real value of working together, of being patient, and of sticking to it until the finish line has been crossed.

Moreover, the project underscored the critical need for ongoing learning and self-examination. Every member of the team was afforded the chance to acknowledge their strengths and pinpoint their parts needing improvement, which established a bedrock for them to build upon as they grew and moved forward in their professional lives (Kolb, 1984).

One of the most important lessons learned from this project is how to manage complex group situations, and keep a team of individuals focused on a project’s collective, end-state goals.

**Section 2 – Reflection of Learning and Development**

**2.1. Introduction**

The project centred on utilizing state-of-the-art machine learning algorithms and sophisticated data analysis to boost the social and academic ambience of our university. This reflective paper centres on what I think are my personal strengths and weaknesses. It goes into detail about continuous self-improvement and development (or, in my case, the lack thereof). It also discusses the group dynamics I experienced over the course of the project. Mostly, though, it talks about my contributions and my part of the project. The project has, in sum, taught me some serious technical skills. More than that, though, it has imparted an understanding of the way teams work and, more importantly, the value of self-progress.

**2.2. Critical Appreciation of Strengths and Weaknesses**

**Strengths**

Effective communication is one of my key strengths. I ensured clarity and transparency within the group by organizing regular meetings and documenting action points. I collaborated with my group, but I also ensured that I heard every group member's voice (Bovée & Thill, 2016). In addition, I worked as a solver and not just a facilitator in analysing complex survey data to identify key trends, such as the following: Financial difficulties and interpersonal relationships impact student motivation.

One of my notable strengths is a proactive approach. When I see a challenge on the horizon, I start planning for contingencies to ensure that the challenge doesn't become a problem that delays a project. One example of this occurred when I saw that the project might be delayed because the data analysis was taking longer than expected. I helped to resolve the issue, and the way I did it keeps me in the good graces of most of the team.

**Weaknesses**

Identified areas that require improvement. Time management—a recurring challenge. Balancing academic responsibilities and project tasks at times led to the feeling of being overwhelmed and resulted in delayed delivery of my portion of the assigned work. To address this using better practices, I now employ productivity tools like Trello and Google Calendar to prioritize tasks.

A different was my early unease with the advanced machine learning techniques. Even though I had the knowledge on which to build, the application of these concepts to actual data felt overwhelming. With encouragement from teammates and the copious resources available online, I cobbled together a semblance of learning. This glaring "hole" in my intellect taught me the importance of both continuous self-improvement and asking for help when that's the only option left.

**2.3. Continuous Self-Development**

This project reinforced the importance of never-ending learning. Because of the nature of machine learning and data analysis, I found that I needed to continuously enhance my skills. For instance, I took a brief online course on Python libraries such as Pandas and Scikit-learn, which turned out to be very valuable for the project's two main tasks: data preprocessing and analysis. Overall, this project greatly ramped up my skills with Python and data analysis. After completing it, I would confidently say that I am employable in either of those capacities.

Another crucial part of my evolution was self-reflection. By regularly checking my performances, I came to see where my ill-defined abilities lay and where my neglected strengths might be. I made straightforward resolutions and followed them, and I'm getting better all the time because I don't forget my mistakes. This part of the book is a "how-to" for the stages of Kolb's experiential learning cycle that I've lived through.

**2.4. Reflection on Group Project Activities**

**Decision-Making**

In our group, decision-making was a shared endeavour. One crucial decision was to choose the focus areas for the survey, which turned out to be things like academic motivation, social integration, and career guidance. I worked on this part and took the lead with something called "data-driven decision-making." I got us going with some collective decisions about what type of area we wanted to focus on for our survey.

**Problem-Solving**

At the core of addressing challenges—like incomplete survey responses—was problem-solving. I put forth the idea of using imputation techniques to handle missing data and allow our analysis to keep its integrity. We used the responses we did have to inform the "smarter" guesses the computer would use to fill in the gaps. When we ran our first model on the complete dataset and got mediocre results, I proposed trying a systematic approach to hyperparameter tuning.

**Communication and Collaboration**

The success of our group was built on the solid foundation of effective communication. We used such collaborative tools as Microsoft Teams and Google Drive to hold virtual meetings and share documents, respectively. These platforms allowed for quite smooth communication among all members and for quite clear (and often repeated) expressions of our project goals. And when disagreements arose among us (as they sometimes do in any group), I was fortunate to have the role of mediator. That group dynamic—virtually smooth, with me allowing just enough room for disagreement to occur—led us to a project proposal that I am quite proud of.

**Innovation and Proactivity**

Our project was driven by innovation. We implemented advanced machine learning algorithms—random forests and support vector machines, for instance—to derive actionable insights from our survey data. I researched optimization techniques for the algorithms that, in a very real sense, made our model more performant. I also took the lead in presenting our findings in a way that impressed our stakeholders. For this, I used Tableau.

**Technical Skills**

The project gave a good opportunity to build technical skills. I worked every step of the way with the data: cleaning it, doing some feature engineering, and evaluating models. I feel confident now in my ability to replicate our work if an opportunity arises. And as a bonus, I learned to read the outputs of various machine learning algorithms, as well as the overall pipeline, and to make sense of them in terms of university recommendations.

**2.5. Key Insights from the Project**

Several critical insights emerged from the survey data. For instance, students' motivation to study was found to be significantly impacted by their financial difficulties, which pointed to an urgent need for financial support and better service delivery around that support. And then there were two more points. One was that a better line of communication between peers led to stronger motivation to study. The other was that stronger motivation was also correlated with better mental health.

We recommended the following:

1. To augment social integration, establish a peer-mentoring program.
2. To support increased awareness of financial aid opportunities, assist our economically disadvantaged students.
3. To alleviate students' worries about post-graduation employability, hold some career guidance workshops.

These conclusions were formed from the data collected over several terms. The process gave us a sharp focus on what "decision making by the data" can really accomplish.

**2.6. Conclusion**

This group project was a transformative learning experience that sharpened my technical, interpersonal, and reflective skills. I learned to critically evaluate my strengths and weaknesses to engage in continuous self-development. I did not lead this group, but my skills in using the Git version control system helped keep our project on track. My next steps are to continue the sorts of self-reflective evaluations that led me to this point, to work on my own innovative ideas and solutions, and to foster the sorts of collaboration that are necessary for complex projects to succeed.

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