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**Final exam**

**Promoting self- regulated in higher education through teaching practices.**

July 1st, 2024

Names: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Total score: 46 points

**Case Study: Self-Regulation Problems in the Discrete Mathematics Course**

The Discrete Mathematics course is a mandatory subject for Computer Engineering students at the Technological University. This course is taught in the second semester and is known for its high level of difficulty due to the abstraction and complexity of the mathematical concepts, as well as the need to apply them to theoretical and practical problems.

The course contents are: Set Theory, Propositional and Predicate Logic, Graphs and Trees, Combinatorics, Number Theory, and Algorithms and Complexity. These topics require a deep understanding and the ability to apply abstract concepts to concrete problems, which poses a significant challenge for many students.

The teacher of this course is Professor Carlos Ruiz, an academic with a solid background in Mathematics and more than 10 years of experience in university teaching, having taught this course for 5 consecutive years. He is known for his dedication and rigorous approach to teaching. However, despite his experience and deep knowledge of the subject, Professor Ruiz has noticed that a significant number of his students have difficulties in self-regulating their learning, which is reflected in low grades, demotivation, and high dropout rates in his course.

**Common Self-Regulation Issues**

Professor Ruiz has observed several common problems among his students related to the lack of self-regulation in learning. These observations are detailed below:

**Procrastination**

Many students delay completing tasks and studying until the last moment, resulting in poor-quality work and superficial learning. This procrastination behavior is especially evident in Ana, a second-year student. Ana feels overwhelmed by the amount of material she needs to cover and tends to postpone her tasks until the night before the deadline. As a result, her work is often incomplete or poorly done, and her performance in exams is poor.

**Lack of Clear Goals**

Students often lack specific and clear objectives for their studies, making effective planning and progress monitoring difficult. Luis, a brilliant student, is an example of this. Although he attends all classes and takes notes diligently, he does not have a structured study plan. This prevents him from effectively monitoring his progress, and he often feels lost when faced with complex tasks or exams. Luis expresses his frustration as follows: "I feel like I understand the concepts when the professor explains them, but when it comes time to study on my own, I don't know where to start. I don't have a clear plan and end up jumping from one topic to another without really delving into any of them."

**Inefficient Study Strategies**

Many students use ineffective study methods, such as passive reading of notes or memorization without understanding. María, another student in the course, prefers to read and reread her notes without trying to deeply understand the concepts or apply them in practical exercises. Additionally, she rarely self-evaluates to check her understanding of the material, resulting in superficial learning and poor academic performance.

**Lack of Self-Evaluation**

Students rarely self-evaluate to identify their strengths and weaknesses, which prevents necessary adjustments in their learning strategies. This problem is common among many students in the course, who do not conduct regular self-evaluations or reflect on their own learning. This lack of self-evaluation limits their ability to adapt their study methods and improve their performance. An anonymous student reflects this sentiment: "I rarely stop to think about how I'm studying or if my methods are working. I just keep going, hoping that what I'm doing is enough. But when I get my grades, I realize I need to change something, though I don't know what."

**Low Motivation**

The lack of intrinsic motivation to learn and understand the concepts of the course is a recurring problem. Many students focus solely on passing exams rather than understanding and applying knowledge. This low intrinsic motivation is reflected in the attitude of several students who do not show interest in delving into the topics beyond what is necessary to pass the exams. One of the students, Pedro, comments on his motivation: "For me, math is just a barrier I need to overcome to graduate. I don't feel any connection to the concepts and only study enough to pass the exams. I don't see the value in learning more than necessary."

**Impact on Academic Performance**

These self-regulation problems have a significant impact on the students' academic performance. The average grades in the Discrete Mathematics course are considerably lower compared to other subjects at the same level. Additionally, the dropout rate in the course is high, with many students opting to retake the subject in later semesters or even change careers due to frustration and the perception of lack of progress.

Professor Ruiz has collected data on student performance over the past five years, observing worrying trends. The average grades have decreased, and the number of students failing the course has increased. These trends suggest that self-regulation problems not only persist but may be worsening.

**Specific Problem Examples**

To illustrate these problems, three fictional cases of students in the Discrete Mathematics course are presented:

**Case 1: Ana**

Ana is a second-year student who has difficulty organizing her study time. She often feels overwhelmed by the amount of material she needs to cover and tends to postpone her tasks until the night before the deadline. As a result, her work is often incomplete or poorly done, and her performance in exams is poor.

Ana struggles with procrastination and time management. Although she is aware of the need to study regularly and in advance, the lack of motivation and the tendency to get easily distracted interfere with her plans. This is exacerbated by the stress and anxiety she feels as deadlines and exams approach.

Ana shares her experience: "I want to be a good student, but I find it difficult to concentrate. Every time I try to study, I get distracted by my phone or social media. When I finally sit down to work, it's already too late to do a good job."

**Case 2: Luis**

Luis is a brilliant student but lacks clear goals for his learning. Although he attends all classes and takes notes diligently, he does not have a structured study plan. This prevents him from effectively monitoring his progress, and he often feels lost when faced with complex tasks or exams.

Luis has difficulty setting specific and measurable objectives for his learning. His lack of structured planning leaves him without a clear guide on what and how to study, resulting in a disorganized and often ineffective approach.

Luis describes his dilemma: "I work hard in class and think I understand the concepts, but when I study at home, I don't know where to start. I feel like I'm walking in the dark, without a clear direction. This makes me waste time and energy on things that may not be as important."

**Case 3: María**

María uses inefficient study strategies. She prefers to read and reread her notes without trying to deeply understand the concepts or apply them in practical exercises. Additionally, she rarely self-evaluates to check her understanding of the material, resulting in superficial learning and poor academic performance.

María relies on passive study methods, such as repetitive reading, which do not promote deep understanding or practical application skills. Her lack of regular self-evaluation means she does not receive adequate feedback on her progress, limiting her ability to improve.

María explains her study method: "I spend hours reading my notes, but it seems I don't retain the information when I really need it. I don't usually do self-evaluations because I think that will only make me feel more insecure about what I know. But, evidently, I need a way to verify my understanding before exams."

**Reactions and Perceptions of Professor Ruiz**

Professor Ruiz, concerned about his students' performance and motivation, has tried several strategies to address these problems, but with limited results. He has implemented additional tutoring sessions, provided online resources, and attempted to incorporate interactive teaching methods. Despite these efforts, the improvement has been marginal, and self-regulation problems persist.

Professor Ruiz reflects on his experience: "I've tried many things to help my students, but it seems that the underlying self-regulation problems are difficult to overcome. Some students improve, but many continue to struggle with the same challenges. This makes me question whether we are doing enough to teach them not only the mathematical concepts but also the skills needed to learn effectively."

**Emotional and Psychological Impact**

Self-regulation problems not only affect academic performance but also the emotional and psychological well-being of students. Anxiety, stress, and lack of confidence are common among those who struggle with procrastination, lack of clear goals, and inefficient study strategies. These problems can lead to a cycle of poor performance and demotivation that is difficult to break.

Ana, Luis, and María have experienced high levels of stress and anxiety due to their academic difficulties. This tension affects not only their performance in the Discrete Mathematics course but also their overall well-being and performance in other areas of their academic and personal lives.

Ana describes the emotional impact: "The stress of not knowing if I will be able to complete my tasks on time or understand the concepts is constant. Sometimes, I feel like no matter how hard I try, I'm always swimming against the current. This leaves me exhausted and demotivated."

Luis comments on his anxiety: "The uncertainty of not having a clear plan generates a lot of anxiety for me. I worry about not being prepared for exams and not reaching my academic goals. This affects my concentration and my ability to enjoy other activities."

María reflects on her confidence: "Every time I receive a bad grade, my confidence plummets. I start to doubt my abilities and feel less capable of facing academic challenges. This creates a negative cycle that is hard to break."

**Conclusion**

The case study of the Discrete Mathematics course and Professor Carlos Ruiz clearly illustrates the significant challenges students face with self-regulation of learning. Procrastination, lack of clear goals, inefficient study strategies, absence of self-evaluation, and low intrinsic motivation are recurring problems that negatively affect students' academic performance and emotional well-being.

Despite Professor Ruiz's efforts and dedication, he is limited in his ability to address these deeply rooted problems. This case highlights the need for more

**Questions:**

1. Using Zimmerman´s self- regulated learning cyclical model, explain each of the students’ problems (María, Ana and Luis). For your answer integrate theoretical contents with information in the case (12 points).
2. Analyze two strategies that Professor Ruiz has used in this course. Identify what stage of self- regulation he´s trying to promote and make hypothesis of why you think they haven’t work (10 points).
3. Elaborate 5 suggestions that you would give to Professor Ruiz to improve his teaching practices to promote self- regulated learning. Explain each one of them (10 points).
4. Choose one of the students of the case and design a strategy that Professor Ruis can use to enhance self-regulated learning, include its aim, description of the strategy, expected outcomes, and how would you assess if it is effective (10 points).
5. Analyze the problems, related to self- regulated learning, present in the students, in general as described by Professor Ruiz and explain in which one is more urgent to intervene (10 points).
6. Propose an intervention for the problem you find more urgent. Present the general aim and 3 specific aims. Describe the intervention and how the teacher has to implement it. Explain how you would assess its effectiveness (16 points).