CSC 120 – INTELLIGENT SYSTEMS
2nd Semester 2024-2025
Section: OS1 & OQ1

Capsule Proposal Template: *Intelligent Systems Application Final Output*

I. Title of the Proposal

Optimizing Student Learning Outcomes with an AI-Based CILO Monitoring System

II. Type of Proposal (Choose One)

- **Current thesis proposal with AI/ML/RL application**

III. Proponent(s)

- Name(s): **Jenny Mae Q. De La Torre & Reonest Espina**
- Course and Year: **BSIT - 3**
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IV. Abstract (150–200 words)

Brief summary of the proposal, including:

- **Problem Statement :** Instructors at Caraga State University face persistent challenges in tracking and assessing students' achievement of Course Intended Learning Outcomes (CILOs). Traditional methods—such as manual quiz creation, grading, and feedback—are time-consuming, delay intervention, and limit both instructors' ability to monitor progress and students' ability to self-assess.

- **Proposed Solution :** To address these issues, this study proposes the development of a web-based CILO Tracker System powered by Artificial Intelligence. The system leverages T5, a text-to-text transformer, to automatically generate quiz questions from instructor's uploaded lecture materials, and BERT, a contextual language model, to provide real-time, personalized feedback based on student responses. Additionally, the system includes a progress tracking feature that allows both students and instructors to monitor performance across specific CILOs through a centralized dashboard.

- **Relevance to AI/ML/RL :** This project is highly relevant to the field of AI and Machine Learning (ML), as it demonstrates the application of Natural Language Processing (NLP) models in automating educational assessments and enabling data-driven instructional

support. By integrating AI, the system promotes personalized learning, scalable evaluation, and outcome-based education.

- **Intended Outcome :** The intended outcome is a fully functional, AI-driven platform that enhances the teaching and learning experience by streamlining assessment processes, improving feedback delivery, and empowering students to track and improve their academic performance aligned with CILOs.

V. Background and Rationale

- **What problem are you solving?**

One of the ongoing challenges in higher education is the inefficiency of traditional assessment methods used to evaluate student performance in relation to Course Intended Learning Outcomes (CILOs). At Caraga State University, instructors often rely on manual quiz creation, written exams, and self-assessment tasks that are time-consuming and provide delayed or inconsistent feedback. This makes it difficult to monitor individual student progress, identify learning gaps, and offer timely interventions.

- **Why is this topic relevant to Intelligent Systems?**

This topic is highly relevant to the field of Intelligent Systems, particularly in Natural Language Processing (NLP) and Machine Learning (ML). By leveraging models like T5 (Text-to-Text Transfer Transformer) for automatic quiz generation and BERT (Bidirectional Encoder Representations from Transformers) for feedback generation, we introduce a system that can process educational content, evaluate student inputs, and offer real-time personalized feedback. These AI models are capable of understanding and generating natural language, making them ideal for educational tasks.

- **Related works, competitions, or studies (cite at least 1–2 references or Kaggle links)**

Korbit.ai: An intelligent tutoring system that uses NLP to give automated hints and feedback, shown to improve learning outcomes by 60% (Kochmar et al., 2020).

AI-Based Quiz System (iQS): Uses a knowledge graph to generate personalized quizzes and feedback in real time (Wang et al., 2023).

VI. Objectives

- **General Objective :** To develop a web-based AI-powered CILO Tracker System that automates the process of generating assessments, delivering feedback, and tracking student performance in alignment with Course Intended Learning Outcomes (CILOs).
- **Specific Objectives (at least 2–3)**

a.) Design and develop an AI-powered system that automates quiz generation and evaluation aligned with identified CILOs.

b.) Implement an automated feedback mechanism that provides real-time insights to help students identify their strengths and areas for improvement.

c.) Establish a centralized platform that enables real-time tracking of student progress toward CILOs for both instructors and students.

VII. Methodology / Technical Approach

- **Tools and Technologies (e.g., Python, TensorFlow, PyTorch, etc.)**

  React.js – for building the user interface
  Python – used for backend development and AI model integration

  Hugging Face Transformers – library used to access pre-trained models like T5 and BERT

  PostgreSQL – relational database to store users, quizzes, CILOs, and results

  Git & GitHub – for version control and collaboration

- **Dataset to be used (state source: Kaggle, open datasets, simulated, etc.)**

  Simulated and curated datasets based on actual CSU course materials and syllabi from the College of Computing and Information Sciences (CCIS)

- **AI/ML/RL techniques (e.g., supervised learning, reinforcement learning, CNNs, etc.)**

  Natural Language Processing (NLP) for understanding and generating text

  T5 Model (Text-to-Text Transfer Transformer) – used for quiz generation from instructional content

  BERT (Bidirectional Encoder Representations from Transformers) – used for feedback generation and performance classification

  Supervised Learning – for training models using labeled input-output data (e.g., quiz content → correct answers, feedback categories)

- **Target Output or Evaluation Metrics**

  A functional web-based CILO Tracker System with:

  - Automated quiz creation
  - Real-time, personalized feedback
  - Dashboard-based progress tracking

  Evaluation Metrics:

  Usability – measured via user surveys (Likert scale)

  Accuracy – alignment of AI-generated quizzes with actual CILOs (reviewed by instructors)

Feedback relevance – precision and usefulness of BERT-generated responses

System performance – response time, success rate of quiz/feedback generation

VIII. References / Links

- **Cite papers, Kaggle URLs, GitHub repos, etc. used as basis or support.**

Kochmar, E., Sinha, K., & Deshmukh, R. (2020). Automated personalized feedback improves learning gains in an intelligent tutoring system. arXiv. https://arxiv.org/abs/2005.02431

Wang, Z., Wang, Y., & Zhou, M. (2023). AI-based quiz system for personalized learning (iQS). DFKI. https://www.dfki.de/fileadmin/user_upload/import/14538_106756.pdf

IX. Expected Output

What do you plan to deliver? (Choose any that apply)

- **Functional demo/prototype**

Expected submission file:

- Capsule Proposal Document (in PDF)
- Presentation slides (5-8 slide presentation of proposal and progress/output)
- Short video on summary/output demo

X. Rubrics

Criteria	Excellent (10)	Good (7)	Fair (5)	Poor (3)	Points
Relevance to Intelligent Systems	Strong use of AI/ML/RL concepts and aligns well with course	Partial relevance or limited concept use	Weak link to intelligent systems	Off-topic or unclear connection	
Clarity of Proposal	Clear objectives, well-written abstract, structured approach	Generally clear with minor lapses	Confusing or vague in parts	Disorganized or unclear	
Technical Feasibility	Uses appropriate models/tools, realistic and implementable	May need refinement but workable	Difficult to implement with current tools	Lacks technical direction	

Criteria	Excellent (10)	Good (7)	Fair (5)	Poor (3)	Points
Creativity and Innovation	Unique approach or adaptation of known ideas	Moderate creativity or adaptation	Standard or common approach	Lacks originality	
Presentation (Slides and/or Video)	Clear, visual, and engaging; video demo provided or well-illustrated	Clear slides, video optional or in progress	Basic slides or verbal only	Lacks effort in presentation	

Progress and Execution	Functional prototype or significant development shown	Partial implementation or result	Limited progress	No clear progress shown	

Total Score: /60

Submission Details

Deadline of Submission: **May 21, 2025, 11:59 PM**

Note: For graduating students, please submit at a much earlier time for completion of your grades.

Should there be any inquiry or clarification, you can send a message in our groupchat or comment on our Google Classroom.

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