IDC4U Interdisciplinary Studies: Artificial Intelligence and Business Innovation

This course aims to equip students with the essential skills and knowledge across various domains, including Artificial Intelligence (AI), computer science, data management, communication technology, and business leadership. The focus is on leveraging these interdisciplinary insights to address complex problems, make informed decisions, create meaningful personal advancements, and drive business innovation. Students will engage in inquiry and research methodologies to uncover strategies for harnessing AI's value in business contexts. The curriculum covers the potential of robotics, natural language processing, and machine learning (ML), empowering students with the understanding and confidence to integrate AI technologies into business strategies effectively. The course delves into the role of AI in fostering business innovation, preparing students to navigate and lead in the evolving digital landscape.

Prerequisites: for IDC4U, any university or university/college preparation course.

Instructors

Owing to its interdisciplinary nature and real-world applications, the course is led by key activator and co-facilitators, AI assistants along with guest speakers from both universities and industry.

By the end of this course, students will:

Overall Expectations (Based on the Ontario Ministry of Education Curriculum)

By the end of this course, students will:

- Demonstrate an understanding of the essential concepts, organizational structures, perspectives, and methods within the studied disciplines: computer science, AI, data science, and communication technology.

- Be able to plan, find, and use information through various research methods and technological tools, enhancing their ability to conduct research for sharing discoveries and solving problems.

- Be able to make connections across various disciplines, thereby constructing meaningful understanding.

- Be skilled in executing and evaluating interdisciplinary projects, comprehending their societal impacts, and connecting interdisciplinary skills to personal development and career opportunities.

Theoretical Framework and Methodological Approach to Design

The curriculum design places a strong emphasis on problem-based learning, transitioning from traditional direct instruction towards an inquiry-based model, as detailed by Fullan (2014). This approach is further enhanced by incorporating the principles of Design Thinking, as proposed by Kelley and Kelley (2013), and by integrating the Knowledge Community and Inquiry (KCI) framework, as developed by Slotta and Najafi (2012).

Course Outline

Module 1: Creating Your Startup Company

- Introduction to Startup Companies
- Developing Your Ideas and Assembling Your Startup Team
- Prepare Your Website and Company Logo
- Introduction to Methodologies in Startups and Innovation: Lean Startup and Design Thinking
- Introduction to Michael Porter's Business Competitive Strategies

Module 2: Foundations of Computer Science and Its Role in Artificial Intelligence

- Programming Concepts
  - Basic Programming Structures: This section covers fundamental programming constructs such as loops, conditions, and data
  - Basic Algorithms: Offers an introduction to key algorithms that are crucial in software development.
- Program Demonstration with Python
- The Relationship between AI and Computer Science

Module 3: Data Science: The Bridge Between Computer Science and AI

This module explores the role of data science in linking computer science with artificial intelligence (AI). As a multidisciplinary field, data science encompasses techniques and theories from mathematics, statistics, computer science, and information science to extract knowledge and insights from data.

Module 4: Leveraging Machine Learning to Drive Business Innovation

- Machine Learning and Its Types
- Analyzing Successful Use Cases of Machine Learning in Business
- Strategies for Implementing Machine Learning in your Startup Company

Module 6: Implementing Robotics for Business Efficiency and Innovation

- AI and Robotics
- Analyzing Successful Use Cases of AI Robotics in Business
- Strategies for Implementing AI Robotics in your Startup Company

Module 7: Responsible Innovation of AI in Business

This module delves into the ethical, social, and regulatory considerations surrounding the use of artificial intelligence (AI) in the business landscape.

Module 8: Navigating the Future of AI: Trends, Challenges, and Opportunities

Module 1: Foundations of Business Analysis: Strategies and Methods

This module aims to acquaint participants with the essential strategies and methods used in business analysis, laying the groundwork for further investigation in later modules. Students will develop a thorough understanding of the role of business analysis within organizations and discover how it supports effective decision-making and strategic planning. We will explore the foundational strategies that enable business analysts to comprehend organizational needs, evaluate business models, and pinpoint areas for enhancement. Emphasis will be placed on Porter's Generic Strategies, Porter's Five Forces, and the design thinking method.

Learning Goals:

- To understand and assess the strategies employed by individuals and organizations in managing stress and conflict effectively.
- To analyze the critical link between strategic planning and an organization's success, emphasizing the importance of strategic decisions.
- To apply various problem-solving strategies to overcome management planning challenges effectively.
- To examine the factors that instigate change within an organization and the dynamics of organizational transformation.
- To assess the diverse strategies managers use to facilitate and gain acceptance for planned changes within the organization.
- To delineate the steps in the control process and understand their connection to the managerial activities of leading, planning, and organizing.
- To elucidate the strategies and principles involved in developing and maintaining a high-quality workforce, focusing on talent acquisition and retention.

Success Criteria

- Analyzes the connection between strategic planning and the success of an organization, pinpointing the impact of critical strategic decisions.
- Investigates and comprehends the drivers of organizational change, detailing the adaptation process.
- Describes strategies for workforce development and retention, showcasing an understanding of effective talent management techniques.
- Demonstrates the ability to utilize Porter's Generic Strategies and Porter's Five Forces for strategic analysis.
- Applies the design thinking method effectively to business improvement initiatives.

Scenario

Imagine that Peter has been promoted to the position of Strategy Manager at the school where he has worked for five years. In this crucial role, he is responsible for conducting a thorough analysis of the organization's strategic plans and utilizing artificial intelligence (AI) to enhance the school's competitive advantage. Despite lacking related background and experience, Peter enrolled in the "Interdisciplinary Studies: Artificial Intelligence and Business Innovation" course to study and improve his qualifications.

Activity 1: Introduce yourself, Discuss with peers and imagine your origination. Report your origination and why you choose it.

Activity 1: Success Criteria Assessment (Assessment for learning)

For each statement, please rate your level of agreement or ability from 1 to 5.

Please use the following scale to rate your level of agreement or ability regarding each statement:

   1 = Strongly Disagree/Unable: Indicates a significant gap in understanding or ability.

   2 = Disagree/Struggling: Shows a basic awareness but considerable difficulty in understanding or applying the concept or skill.

   3 = Neutral/Adequate: Suggests an average level of understanding or ability.

   4 = Agree/Competent: Reflects a strong understanding or ability.

   5 = Strongly Agree/Fully Able: Signifies a high level of mastery.

 Question:

1. Analyzing the Connection Between Strategic Planning and Organizational Success
   I can analyze the relationship between strategic planning and the success of an organization, pinpointing the impact of critical strategic decisions.
        1 2 3 4 5

2. Understanding Organizational Change
   I understand the drivers of organizational change and can detail the adaptation process.
        1 2 3 4 5

3. Describing Workforce Development Strategies
   I can describe strategies for workforce development and retention, showcasing an understanding of effective talent management techniques.
       1 2 3 4 5
4. Utilizing Strategic Analysis Tools
   I demonstrate the ability to use Porter's Generic Strategies and Porter's Five Forces for strategic analysis.
       1 2 3 4 5

5. Applying Design Thinking in Business Improvement
   I effectively apply the design thinking method to business improvement initiatives.
       1 2 3 4 5

Activity 2: Inquiry-based Learning

2.1 Formulating Inquiry Questions

In the Success Criteria Survey, for any topic you rate lower than 4, you are encouraged to condcut inquiry-based learning.

Let's use Peter's study as an example **(Video Version: Click to watch Video)** to illustrate how to conduct inquiry-based learning:

Given Peter's evaluation score of 1 for "Utilizing Strategic Analysis Tools," this indicates that Peter has a limited understanding of how to apply strategic analysis tools within a business context. To improve, Peter is advised to formulate specific questions to guide his research. This method will facilitate a deeper understanding and application of strategic analysis tools. Suggested questions include:

- What is Strategic Analysis?
- What are Porter's Generic Strategies?
- What is the Difference Between Porter's Generic Strategies and Porter's Five Forces?
- Can you provide a Case Study where Porter's Generic Strategies were applied in strategic business analysis?
- What are the Advantages and Disadvantages of Porter's Generic Strategies?
- How did Porter contribute to Strategic Analysis?
- What other Strategic Analysis Tools are related to Porter's analyses?
- What are some additional topics on Strategic Analysis and Porter's theories?

2.2 Conducting Inquiry

Peter then embarks on a series of inquiries using platforms such as ChatGPT, Google, YouTube, Google Scholar, and other relevant sources. He diligently processes and analyzes the gathered information, comparing his findings against existing knowledge to draw preliminary conclusions.

2.3 Reflecting and Discussing

Peter takes time to reflect on his findings, engaging in discussions with peers and teachers to explore the implications of his research. This collaborative process of reflection enhances understanding, challenges pre-existing assumptions, and may spark new questions or insights.

2.4 Creating

Peter compiles his research into a PowerPoint presentation, showcasing how Porter's Generic Strategies and Porter's Five Forces can be utilized for strategic analysis in a school context.

2.5 Sharing and evaluating (assessment as learning)

Peter shares his findings by presenting his PowerPoint to his group or class. This presentation offers an opportunity for feedback and evaluation from both peers and educators.

2.6 Revising (assessment as learning)

Reflecting on the feedback received, Peter is encouraged to revisit earlier steps as necessary to refine his questions, methodologies, or conclusions. This iterative process underscores the dynamic nature of inquiry-based learning.

To do list for all students

1. Formulate a series of topics or questions related to questions you rate is low than 4. Each student chooses one question.
2. Conduct inquiry again your questions
3. Reflect and discuss your findings with you peers
4. Create a PPT to present your work
5. Present your PPT to your group or class and collect feedback
6. Revise your findings based on feedback

Activity 3: Redo Success Criteria Assessment (Assessment of learning)

Activity 4: Submit report of your research process and result for your research question (Assessment of learning). Attached Peter's submit for your reference.

1. Summary your research steps: the **Success Criteria question you work on, your** Inquiry Questions or prompts
2. Findings and feedback your received
3. Your final answer or solution of Success Criteria question you work on.

Activity 5: Interview with teacher to explain how does activity 4

Reference:

Kelley, T., & Kelley, D. (2013). *Creative confidence: Unleashing the creative potential within us all*. Currency.