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IDC4U Interdisciplinary Studies: AI and Business Innovation

Final Project: Implementing AI Initiatives in Your Startup Business

Company Name: Learning21
Team: Lily, CEO; Kim, Business Strategy Analyst; Tom, Technology Specialist; Kathy, Digital Marketing Manager; Jackson, Course Designer; Grace, Policy Advisor

AI Executive Summary for Your Startup (300 to 500 words)

Emerging technologies and artificial intelligence are poised to reshape the educational landscape, redefine learning and teaching processes, and transform the roles and responsibilities of teachers. We are launching a startup, Learning21, to integrate human and machine collective intelligence, thereby enhancing both teaching and learning experiences. Our aim is to redefine 21st-century education, making Learning21 synonymous with the future of learning.

Learning21 will offer a versatile platform designed to facilitate both online and in-class learning experiences. We aim to revolutionize hands-on, inquiry-based, and cooperative learning by integrating emerging technologies and artificial intelligence. We will use the Knowledge Community and Inquiry (KCI) as the theoretical framework to guide our course design.

To turn this vision into reality, Learning21 will begin with minimal staff and develop a proposal before seeking angel investors. Initially, our team will include a CEO, a Business Strategy Analyst, a Technology Specialist, and a Digital Marketing Manager, who will all collaborate with consultants.

Learning21 will collaborate with schools worldwide to provide K-12 formal education, afterschool programs, tutoring services, and camps. Learning21 will supply schools with a learning platform, courseware, and teaching staff to help implement and deliver courses. The courseware will be customized to meet local ministry requirements.

Learning21's competitive strategy is centered on focus, with differentiation playing a crucial complementary role. Our focus strategy targets affluent K-12 students worldwide. Regarding differentiation, we distinguish ourselves from traditional K-12 education in three main areas: providing specialized programs that teach students how to learn, initiating a

learning community with a strong emphasis on inquiry-based learning and leadership excellence, and fostering a collaborative learning community of human and machine Intelligence.

In addition to differing from traditional K-12 education, Learning21 also seeks to learn from MOOC platforms such as Coursera, Udemy, Udacity, Datacamp, edX, DataQuest, Khan Academy, and TheSchool.ai, setting ourselves apart from them as well.

To revolutionize teaching and learning, and to further enhance the Learning21 platform, we have planned to develop the following AI-powered products:

- **EduGuider Bot:** EduGuider Bot is an AI-driven guidance system designed to help students navigate their learning paths with personalized course recommendations. (Main Contributor: Lily)

- **EduTutor Bot:** EduTutor Bot is an AI tutor offering one-on-one or small group assistance to students. It can help with homework, clarify complex topics, and provide explanations and examples tailored to each student's learning pace and style. (Main Contributor: Jackson)

- **Learning Analyser:** This application analyzes students' learning data to provide insights into their progress, challenges, and performance. It helps educators understand how students interact with materials and identify areas where students may need additional support. (Main Contributor: Kim)

- **Instant Monitor:** Instant Monitor is an AI-powered tool for real-time monitoring of student learning activities, designed to detect cheating and plagiarism, and ensure learning integrity. (Main Contributor: Grace)

- **EduHumanoid Bot:** EduHumanoid Bot is an interactive humanoid AI robot that can physically interact with students. It can be used in classroom settings to demonstrate experiments, provide interactive learning sessions, and collaborate with human teachers to create a collective intelligence learning environment. (Main Contributor: Tom)

- **AI Avatar Presenter:** An AI-powered presenter that uses an avatar to deliver educational content. This could make learning more engaging and accessible,

especially in virtual or remote learning environments where human interaction is limited. (Main Contributor: Kathy)

In collaboration with human teachers, these AI-powered products will transform educational experiences, distinguishing Learning21 from competitors. This strategy aligns with Porter's differentiation approach, emphasizing unique value and innovative solutions.

Proposed AI Initiative (500 to 800 words)

The Learning21 AI initiative includes six key applications: EduGuider Bot, EduTutor Bot, Learning Analyser, Instant Monitor, EduHumanoid Bot, and AI Avatar Presenter.

EduGuider Bot (Main Contributor: Lily)

EduGuider Bot is an AI-driven guidance system designed to help students navigate their learning paths with personalized program/ course recommendations. It is designed to streamline the recruitment process, significantly reducing the dependency on international offices and numerous recruiting agents, which are traditionally expensive and logistically challenging.

OpenAI ChatGPT, Meta LIMA, and Google Gemini are examples of general-purpose chatbot models that provide broad and powerful answers. However, they are not specialized to handle specific inquiries or provide consultations for unique domains. To fill this gap, we plan to develop the customized chatbot, EduGuide21, specifically tailored to serve both potential and existing students of Learning21.

We intend to integrate EduGuide21 into the Learning21 website to maximize its accessibility and train the model using a chatbot builder for a cost-efficient, codeless solution with a rapid development cycle. EduGuide21 will support both voice and text inquiries and will be multilingual. We have identified several voice-enabled chatbots, such as VoiceGPT, DialogAI, QuickChat, and Botsonic, that could be incorporated.

Furthermore, we plan to integrate EduGuide21 with popular social media platforms, such as WhatsApp and WeChat, and develop independent apps that can be downloaded and installed on cellphones. We will conduct further research and testing to determine the best-suited options for our needs.

EduTutor Bot(Main Contributor: Jackson)

EduTutor Bot is an AI tutor offering one-on-one or small group assistance to students. It can help with homework, clarify complex topics, and provide explanations and examples tailored to each student's learning pace and style.

EduTutor Bot's design is similar to that of EduGuider Bot; however, the model is trained with different learning content.

Learning Analyser(Main Contributor: Kim)

This application analyzes students' learning data to provide insights into their progress, challenges, and performance. It helps educators understand how students interact with materials and identify areas where students may need additional support.

To address the labor-intensive and time-consuming nature of manually monitoring student learning progress, Learning21 plans to implement a cutting-edge solution by integrating a Moodle learning analytics plugin into our existing Moodle Learning Management System (LMS). This strategic enhancement is designed to significantly streamline the management and oversight of student learning, shifting from a manual to an automated approach.

The key component of this solution is the development of a supervised machine learning model, which will be trained using a rich dataset of historical academic records. This dataset, meticulously compiled and regularly updated with new student performance data, will serve as the foundation for the model. The machine learning model will be engineered to analyze patterns in student behavior and academic results, effectively diagnosing learning issues and predicting future academic outcomes with high accuracy.

By automating the analysis of student data, this plugin will empower teachers and educational counselors to focus more on intervention and less on data gathering. They will be able to quickly identify students who may be struggling or those who could benefit from more challenging material, and tailor their instructional strategies accordingly.

Additionally, the ongoing updates to the dataset will ensure that the learning analytics system remains dynamic and adaptable to changing educational trends and student needs. This continuous improvement will help maintain the system's effectiveness and relevance, providing educators with a powerful tool to enhance educational outcomes and foster a more personalized learning environment.

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Instant Monitor(Main Contributor: Grace)

Instant Monitor is an AI-powered tool for real-time monitoring of student learning activities, designed to detect cheating and plagiarism, and ensure learning integrity.

Learning21 is committed to addressing the pervasive issue of plagiarism, which affects both online and classroom learning environments. To combat this challenge, we plan to develop a comprehensive instant monitoring system designed to verify learners' identities and monitor their engagement during study sessions. This advanced system will employ facial recognition technology to observe learners' faces, emotions, and gestures, ensuring that the person participating in the session is the actual registered student.

Additionally, our monitoring system will track a variety of learner activities. This includes the uploading of assignments and active participation in online discussions, which are critical touchpoints in the learning process. By monitoring these interactions, we can ensure that submissions and communications are conducted in a fair and honest manner.

The technical backbone of this system will be sophisticated machine learning algorithms and trained models, which are adept at processing complex visual and behavioral data in real time. These models will be continuously refined and updated to maintain accuracy and effectiveness.

To further enhance the integrity of academic submissions, our system will be integrated with leading plagiarism checker applications such as Turnitin, GTPZero, and Originality.AI. These tools are essential for analyzing the originality of student assignments by comparing them against extensive databases of existing works. By integrating these plagiarism checkers, we can provide a layered approach to prevent and detect plagiarism effectively.

Our goal with this solution is not only to minimize plagiarism but also to uphold the highest standards of academic integrity, providing a trustworthy foundation for evaluating student work. This proactive approach ensures that Learning21 remains at the forefront of ethical educational practices, benefiting both educators and learners by fostering a culture of honesty and accountability in educational assessments.

EduHumanoid Bot *(Main Contributor: Tom)*

EduHumanoid Bot's primary role is to provide direct instructional support, allowing human teachers more time to focus on fostering critical thinking skills and addressing the emotional and social development needs of their students. This strategic deployment of AI in teaching not only streamlines the educational process but also enriches the learning experience by ensuring that educational delivery is both efficient and highly interactive.

In line with Michael Porter's differentiation strategy, this innovative approach will provide Learning21 with a distinctive edge in the competitive educational market. By offering a unique blend of human expertise and robotic efficiency, we aim to attract a broader student base and elevate the overall quality of education provided.

To ensure the successful implementation of EduHumanoid Bot's, we are currently assessing various high-tech robotic platforms that could support this initiative. Among the contenders are NAO and Pepper, both known for their interactive capabilities and suitability in educational environments. Additionally, we are considering the Sophia robot, renowned for its sophisticated AI and humanoid appearance, and Furhat, a social robot with advanced conversational skills and facial expressions. These technologies are being evaluated for their potential to seamlessly integrate into classroom environments and interact effectively with both students and staff.

This ambitious project requires careful planning and significant investment in technology. However, the potential benefits in terms of enhanced educational outcomes and operational efficiency make it a worthwhile endeavor. By embracing AI-driven teaching assistants, Learning21 is not just adapting to technological advancements but is actively shaping the future of education.

AI Avatar Presenter(Main Contributor: Kathy)

In the ever-evolving educational landscape, integrating innovative technologies is pivotal for enhancing teaching methodologies and student engagement. Learning21 propose the adoption of AI Avatar technology to conduct presentations in the classroom, serving as an alternative to traditional teacher-led instruction. This initiative will utilize cutting-edge AI Avatar generation platforms such as Synthesia, D-ID, Colossyan, and others including NVIDIA AI Avatars, Digital People by Soul Machine, and Microsoft Mesh avatars. These tools offer realistic and interactive digital personas that can deliver educational content effectively.

The use of AI Avatars is not only a forward-thinking approach to education but also a cost-effective solution. By adopting this technology, schools can reduce the workload on teachers, allowing them more time to focus on personalized student interactions and other critical teaching tasks. AI Avatars can provide consistent, engaging, and diverse presentation styles, tailored to enhance student learning experiences.

This proposal aims to pilot the use of AI Avatars in selected classes with the goal of evaluating their impact on student engagement and educational outcomes. With the support of this technology, we can transform the conventional classroom setting into a dynamic learning environment that captivates and educates students through the innovative use of digital human technology.

Action Plan (500 to 800 words)

Learning21 is a startup company that will begin with minimal staff. Our team will include a CEO, a Business Strategy Analyst, a Technology Specialist, and a Digital Marketing Manager, all of whom will collaborate with consultants. To implement our AI initiative, we have created the following action plan:

A: Reskill our management team and recruit skilled AI consultants.

Timeline: This is an ongoing task with a primary focus in the first year.

This step focuses on enhancing the capabilities of our management team through targeted reskilling in AI technologies and methodologies. Simultaneously, we aim to bolster our expertise by recruiting highly skilled AI consultants. This strategic development ensures our leadership is equipped to drive AI integration and innovation effectively.

We will sponsor our staff to participate in both formal and informal AI training, including Coursera courses, attendance at AI conferences such as the AI Academy in Toronto, and product vendor training.

B: Data Plan and Preparation

Timeline: This is an ongoing task with a primary focus in the first six month.

We will collect available public datasets and establish policies and procedures to prepare our proprietary data. We access various education-related datasets, such as Student Study Performance, Student Attitude and Behavior, School Attendance, Marks, Stress Factors, along with datasets predicting dropout rates and academic success. These datasets are crucial as they enable us to explore learning patterns, performance metrics, and factors influencing student outcomes. By analyzing this data, we can identify trends, predict future educational challenges, and tailor our interventions more effectively.

Kaggle offers various education-related datasets, including the "The MOOC Wars" series. Additionally, we will explore other data sources such as Amazon Datasets, the UCI Machine Learning Repository, and Google's Dataset Search Engine to further enrich our analytical capabilities.

C: Application Implementation

EduGuider Bot Main Contributor: Lily)

- Bot Builder Research and Selection: 3 months
- Data Collection and Cleaning: 6 months
- AI Model Training: 2 months
- Review and Testing: 2 months
- Use and Continuous Tuning: 1 year

EduTutor Bot(Main Contributor: Jackson)

EduTutor Bot will be implemented simultaneously with EduGuider Bot. EduTutor will be continuously trained alongside the progress of course development.

Learning Analyser(Main Contributor: Kim)

Learning Analyser will be implemented after one year of collecting learner data. The expected development time is 3 months, provided we have enough datasets.

Instant Monitor(Main Contributor: Grace)

- Research and Technology Selection: 3 months
- Ethical Research, Policy, and Procedure Preparation: 3 months
- Data Collection and Cleaning: 6 months
- AI Model Training: 2 months
- Review and Testing: 2 months
- Use and Continuous Tuning: 1 year

EduHumanoid Bot(Main Contributor: Tom)

- Product Research and Analysis: 4 months
- Acquisition and Logistics: 2 months
- Teacher Professional Development Sessions: 4 months
- Review, Testing, and Evaluation: 4 months
- Continuous Improvement

AI Avatar Presenter (Main Contributor: Kathy)

Numerous AI Avatar generation platforms, including Synthesia and Heygen, are available to create AI Avatars. The AI Avatar Presenter can be implemented on demand, offering flexibility and accessibility for users seeking innovative presentation solutions.

D: Ethical consideration

The planned initiatives by Learning21 introduce several ethical challenges, particularly in legal and ethical compliance. Initiatives must adhere to relevant laws and ethical standards, such as the Personal Information Protection and Electronic Documents Act (PIPEDA) which governs how private sector organizations manage personal information within commercial activities.

The utilization of facial recognition technology in Learning21's instant monitoring initiative poses significant privacy concerns. Constant surveillance of learners' faces, emotions, and gestures could be perceived as intrusive. It is vital to establish clear guidelines regarding the storage, access, and retention of this data to protect learners' privacy and dignity.

Implementing such technology also requires obtaining informed consent from participants, ensuring they have the autonomy to opt-in or opt-out. This autonomy raises questions about alternative assessment conditions for those who choose not to participate.

Moreover, the reliability of the technology in accurately detecting plagiarism and verifying identities without errors is a crucial concern. Misidentifications could lead to unfair impacts on students' academic records.

Additionally, the continuous monitoring might create a high-pressure environment, potentially harming students' mental health and academic performance due to the stress of being under constant surveillance.

Furthermore, the system will collect and store sensitive personal data, necessitating robust cybersecurity measures to prevent breaches and unauthorized access.

Learning21's other initiatives likely face similar ethical concerns, which we must address carefully to develop transparent, fair, and effective AI solutions.

Conclusion (100-200 words)

Emerging technologies and artificial intelligence are set to revolutionize the educational landscape, transforming how we approach teaching and learning, as well as altering the roles and responsibilities of educators. At Learning21, our goal is to merge human and machine intelligence, thereby enriching both teaching and learning experiences. We aim to redefine education for the 21st century, positioning Learning21 at the forefront of educational innovation. To achieve this, we have proposed six strategic applications. We regularly share our insights and developments on our website to maximize our exposure and attract potential angel investors. For the latest updates, visit us at www.learning21.ca.