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STEAME ACADEMY
TEACHING FACILITATION LERNING & CREATIVITY PLAN (L&C PLAN) – LEVEL 2 SERVICE TEACHERS:
Applications of AI in real world for improving the quality of life

S ● **T** ● **Eng** ● **A** ● **M** ● **Ent** ●

1. Overview

Title	Applications of AI in real world for improving the quality of life
Driving Question or Topic	1. What does it mean quality of life, why is it important and what action is needed for improving it? 2. How do technology and technological developments influence the human needs? 3. What scientific and technological background has been exploited in order to develop such applications? (ranging from antiquity to Turing's question and to modern approaches in the field of AI) 4. What human ideas/ creations were the ancestors that led to the developments of AI and to what extent do these reflect the evolution of applications relating to human needs 5. What are some applications of AI in the real world and what are their consequences on human life? 6. What are the pros and cons of these applications and how do we expect them to influence our way of living? 7. What are some areas of human activities where applications of AI are having or are expected to have repercussions? 8. What actions should be taken in order to alleviate such repercussions in order to guide humanity to the right way of quality of life? 9. What are some prospective areas for promoting and applying AI's methods and approaches that will have value added in the quality of life? 10. What actions can be suggested for enhancing the positive effects of the applications of AI and minimizing the negative effects?
Ages, Grades, …	AGES: 16-18 10^{th} - 12^{th} grade

Duration, Timeline, Activities	17 LEARNING HOURS	17*45 MINUTES at least	4 ACTIVITIES at least
Curriculum Alignment	Technological Developments in the area of AI and connections to various scientific fields as consequences of respective phenomena, processes, or models. Consideration of historical events in the development of AI and their effects on Economy, Social Edifices and Activities, Civilization and Communication Uses/ applications of AI in various curriculum areas Philosophical reflection and debate, through the involvement of the students in the learning activities, is expected to develop their capabilities for consideration of applications of AI in a spirit that will be supporting humanity in its goal for quality of life. In this process, it is expected that the students will work in a context that will maximize the advantages and minimize the disadvantages of the application under consideration. Furthermore, this involvement is expected to have positive effects on the students as prospective creators/ users of further/ other applications.		
Contributors, Partners	In the context of the consideration of this topic, it is going to be useful to include the cooperation of a number of experts/ teachers covering a broad spectrum of the realms of meaning. Thus, it is suggested to involve a teacher of Sociology/Economics, a teacher in the area of STEAM and a teacher of IT. The students are expected to be involved in project activities that will provide the opportunity for philosophical meditation, consideration of ethical and practical questions relating to a number of applications, as well as the scientific background and technological know-how that forms the backbone of AI. In this process, the students will be required to indulge in identifying various applications of AI in real life and study their effects on various social, economic and political factors that form the term quality of life.		
Abstract - Synopsis	**Applications of AI in real world for improving the quality of life** This topic and the respective L&C Plan are aiming at providing a series of activities that will set the framework that will involve the students in the consideration of applications of AI and will develop competencies that they are going to help them in exploiting these applications in a context supporting humanity and aiming at quality of life. Furthermore, this involvement is expected to have positive effects on the students as prospective creators/ users of further applications. In the context of the consideration of this topic, it is suggested the development of an approach that will lead to the cooperation of a number of experts/ teachers covering a broad spectrum of the realms of meaning. Thus, it is expected to involve a teacher of Sociology/Economics, a teacher in the area of STEAM and a teacher of IT. The students are expected to be involved in project activities that will provide the opportunity for philosophical meditation, consideration of ethical and practical questions relating to a number of applications, as well as the scientific background and technological know-how that forms the backbone of AI. In this process, the students will be required to indulge in identifying various applications of AI in real life and study their effects on		

	various social, economic and political factors that form the term quality of life.
References, Acknowledgements	• Michael Negnevitsky: "Artificial Intelligence: A Guide to Intelligent Systems", Pearson Education Limited, 2011 (Edition 3) • S. Russell and P. Norvig: "Artificial Intelligence A Modern Approach" Pearson Education, Ltd., London. Webpages: • Applications of Artificial Intelligence in real world - Ready For AI. • What Is Quality of Life? Why It's Important and How to Improve It (investopedia.com) • https://towardsdatascience.com/advantages-and-disadvantages-of-artificial-intelligence-182a5ef6588c

2. STEAME ACADEMY Framework*

Teachers' Cooperation	Teacher T1 (teacher of IT) with the main responsibility of identifying and promoting/ helping in the development of activities in areas of applications of AI. Teacher T2 (teacher of Sociology/ History/ Language) and Teacher T3 (teacher of Economics) with main responsibility of taking care of elements related to the effects/ impact of applications of AI in the real world and with consequences on the quality of life. Teacher T4 (teacher of STEAM) with the main responsibility of dealing with the scientific/mathematical aspects of the activities involved in the project.
STEAME in Life (SiL) Organization	The teachers should meet at the initial stages and identify a number (4-5) of applications of AI that are or will be expected to have an impact on real and everyday aspects of human life. In this context, they could consider the Driving Questions (above or if they have the opportunity to extend them) and based on these, develop a first draft of activities. Based on this they proceed to the Action Plan Formulation.
Action Plan Formulation	**STAGE I**: Preparation by one or more teachers [STEPS 1-4], and **STAGE II**: Action Plan Formulation [Preparation STEPS 1-3] Refers to the creation of this Learning Plan, by teachers in collaboration. **STAGE II**: Action Plan Formulation [Development STEPS 4-18] Refers to the realization by the students of the five activities of the Learning Plan. The support, feedback and evaluation by the teachers are accompanied throughout the implementation of the activities.

* *under development the final elements of the framework*

3. Objectives and Methodologies

Learning Goals and Objectives	In the context of this L&C Plan, students are expected to be able for the following: 1. To identify and explain the meaning of quality of life (in the context of the contemporary world as well as in the context of various cultures and civilizations).

	2. To identify and study the outcomes and impact of various applications of AI in the real world. 3. To study the basic constituents of the scientific and technical background of these applications aiming at understanding their way of influencing the human life. 4. To identify the positive and negative effects of such applications of AI in relation to everyday human activities or conditions (work, health, etc.). 5. To provide suggestions or ideas that will set conditions that such applications will maximize the positive effects and minimize the negative effects. 6. To provide solutions to problems arising from such applications so that the concept of quality of life will cruise in a moral society.
Learning Outcomes and expected Results	The involvement of students in the learning activities is expected to provide them with the capabilities for consideration of applications of AI in its spirit that will be supporting humanity in its goal for quality of life in a context that will maximize the advantages and minimize the disadvantages of the applications they considered. Furthermore, this involvement is expected to have positive effects on the students as prospective creators/users of further applications.
Prior Knowledge and Prerequisites	Basic Knowledge of the concepts of AI. The ability for critical consideration and capability for discussion, as well as indulging in investigating and analytical involvement.
Motivation, Methodology, Strategies, Scaffolds	The students are provided with challenging events on various applications of AI and are called to analyze, mediate and study their effects in the spirit of the critical driving questions presented earlier, thus forming views on the pros and cons of the applications and on the impact to the quality of life. The basic methodology should provide ample opportunities for discussion as well as for suggestions of approaches in the use of the application in the spirit of the human condition. Project work is also an important tool in the methodology of approaching this issue as it can provide the context for creating the background as well as the framework for investigation and consideration of the various issues that step out during the consideration of the driving questions identified in section 1.

4. Preparation and Means

Preparation, Space Setting, *Troubleshooting Tips*	The team of teachers that are to indulge in this topic must have a broad consideration of their own subject area as well as the impact that the applications of AI have on the quality of life. Thus, it is essential that T2 and/ or T3 set the context of the meaning of quality of life and develop ideas/ questions for reflection, both at the meetings of the group of teachers as well as at the work with the students. Thus, T1 (teacher of IT) will be able to propose applications for consideration. Obviously, these topics are a matter of exchange of ideas and discussion by the teachers.

	Depending on the areas of realms of meaning involved in the previous ideas teacher or teachers (T4) will have to be involved to set the forum for scientific/ technological/ mathematical considerations. Based on the partnership the team of teachers will proceed to design the Steps of the Action Plan (see Section 2). With this in mind, one would expect meetings with the students that will involve classes where T1 will have the opportunity of presenting an Application, T2 or T3 will discuss the implications for the quality of life and T4 will consider the technological/ scientific/ mathematical aspects.
Resources, Tools, Material, Attachments, Equipment	The web is a very rich resource for information concerning this topic using as keywords the driving questions in Section 1. Furthermore, the whole issue is the object of consideration by many organizations like UNESCO, the OECD, the WORLD ECONOMIC FORUM, the WORLD BANK, etc. In addition, organizations like NASA and IBM provide ample material and resources. Thus, a basic tool for the investigation can be provided by the Computer Lab or by the Personal PC and the Internet.
Health and Safety	

5. Implementation

Instructional Activities, Procedures, Reflections	An approach for the implementation is as follows: **<u>Activity 1 (1 period (40 to 45 minutes)) Brainstorming activity</u>** (Usually Under the auspices of T2/ T3 although any other teacher can be the facilitator) Brainstorming with the requirement of developing a project requiring to consider the examples of TALOS and Pandora Jar from Greek mythology. In the process of examining these examples, the students will have to identify elements relating to AI/ automation and then to proceed in identifying and discussing their effects on the quality of life in conjunction with the pros and cons of the adoption of the possibility of realizing these mythological entities. Discuss the possible improvements in the life of humans if these were realities. Search the web to identify applications of AI that could be considered as ideas that reflect mythical entities. **<u>Activity 2</u>** **Consider the Application of AI that leads to a *self-driving car*** <u>Activity 2a (1 period in the class plus extra time for homework)</u> T1 is the facilitator in the process of studying this application. T1 provides material to the students that set the context for understanding the principles (these principles are to be explored further at the stage of Activity 2b) on which a self-drive car is running. He/ she sets questions that help the students in indulging in the ideas and possibly technicalities of developing the algorithmic processes that allow a car to self-drive. In this effort, he/ she has as a guide the Driving questions of section 1 so that the students observe an eye on the expected impact on the human condition.

He/ she suggests to the students to refer to their STEAM teacher T4 for support/ instruction on the consideration of the scientific, technological and mathematical tools that provide the means for the realization of the algorithmic process.

Activity 2b (1 period in class plus extra time for homework)

T4 is now the facilitator for studying the application. As in the case of T1, he/ she provides material to the students that set the context for understanding the various technological, scientific and mathematical tools that enable a self-drive car to operate following the instructions of the algorithmic process developed earlier. He/ she sets questions that help the students in getting interested and involved in the ideas and scientific/ mathematical tools that govern (in the area of automation) the running of the self-drive car. In this effort, he/ she has as a guide the Driving questions of section 1 so that the students observe an eye on the expected impact on the human condition and the quality of life.

He/ she suggests to the students to refer to their teacher T2 or T4 for support/ instruction on the consideration of the social, economic, political and ethical questions that provide the context for the realization of what could be identified as a quality of life.

Activity 2c (2 periods in class plus extra time for homework)

T2 or T4 is a facilitator for the development of project work and discussion/ debate based on the outcomes of Activities 2a and 2b as well as the Driving questions of Section 1. The emphasis should be on the consideration of the needs of the real world and the aspects constituting the quality of life. In this process, the students should include documented claims for the goal of improving the quality of life through this Application of AI.

Thus, in the present activity, an important issue that has to be the object of discussion is the advantages that are offered to mankind through this application.

At this stage of this Activity, T2 or T4 would include facts, remarks and questions that are leading the students to be involved in project activities that will provide the opportunity for philosophical meditation, consideration of ethical and practical questions relating to a number of applications as well as to the scientific background and technological knowhow that forms the backbone of AI. In this process, the students will be required to get involved in identifying various applications of AI in real life and study their effects on various social, economic, and political factors that form the term quality of life.

In the present case of the application of the self-drive car the following **observation/ problem/ issue** is a basis for developments based on the remarks just identified:

A self-driving car kills a child. How do you deal with this case?

Also, a blind person is using a self-driving car. What advantages does this case suggest?

What do you think about this? What ethical, political, and social issues have to be considered?

What changes do you suggest for improving the application or the way it is used?

Activity 3, 4, 5, …

	The procedure of activity 2 is to be repeated for other applications of AI. In particular, the selection of applications would be useful to offer opportunities for consideration of the following problems: (This selection could be the outcome of assigning to the students the consideration of the issues) 1. **The Job loss problem**. According to many studies due to a lot of applications of AI, quite a number of jobs have been lost and many millions of people are out of work. Actually, in view of the advances in the area of AI, more and more people (even skilled ones) will be out of work. How do we deal with this threat and to what extent do we consider it as an issue for the quality of life? 2. **The safety and personal life issues**. As a result of the developments in AI, we observe quite a number of problems concerning either the safety of the personal life or the personal data and property of a person. There are grave concerns that these developments might be catastrophic to humankind. On the other hand, these developments provide a broad range of positive impacts on the safety of a person and the fighting of crime. Thus, it is sound to set questions concerning our quality of life. 3. **The question of the extent of trusting** the outcomes of the various applications of AI, as for the majority of us it is not possible to check what they are proposing or suggesting to us. Thus, again it is sound to set questions about such developments in the context of the quality of life. **Activity X** Each of the teachers T1, T2/T3, T4 and in the context of his/her subject area would consider the ideas, conclusions and issues derived from activities 2, 3, …, assess the whole effort for developing AI applications and provide a context of the discussion that has to govern/ guide the adoption of such applications in real life
Assessment - Evaluation	Assessment and evaluation are continuous and concurrent during all activities with continuous support and guidance from teachers to achieve the objectives of each activity.
Presentation - Reporting - Sharing	After completing each activity, the students' presentations/ debates can be published on the school's website, relevant publications can be made in the school's newspaper.
Extensions - Other Information	Meetings can be held with software development specialists for discussion and possible development/ adaptation of an app that serves the needs/changes suggested by the students.

STEAME ACADEMY Prototype/Guide for Learning & Creativity Approach
Action Plan Formulation

Major steps in the STEAME learning approach:

STAGE I: Preparation by one or more teachers

1. Formulating initial thoughts on the thematic sectors/areas to be covered
2. Engaging the world of the wider environment / work / business / parents / society / environment/ ethics
3. Target Age Group of Students - Associating with the Official Curriculum - Setting Goals and Objectives
4. Organization of the tasks of the parties involved - Designation of Coordinator - Workplaces etc.

STAGE II: Action Plan Formulation (Steps 1-18)

Preparation (by teachers)

1. Relation to the Real World – Reflection
2. Incentive – Motivation
3. Formulation of a problem (possibly in stages or phases) resulting from the above

Development (by students) – Guidance & Evaluation (in 9-11, by teachers)

4. Background Creation - Search / Gather Information
5. Simplify the issue - Configure the problem with a limited number of requirements
6. Case Making - Designing - identifying materials for building / development / creation
7. Construction - Workflow - Implementation of projects
8. Observation-Experimentation - Initial Conclusions
9. Documentation - Searching Thematic Areas (AI fields) related to the subject under study – Explanation based on Existing Theories and / or Empirical Results
10. Gathering of results / information based on points 7, 8, 9
11. First group presentation by students

Configuration & Results (by students) – Guidance & Evaluation (by teachers)

12. Configure STEAME models to describe / represent / illustrate the results
13. Studying the results in 9 and drawing conclusions, using 12
14. Applications in Everyday Life - Suggestions for Developing 9 (Entrepreneurship - SIL Days)

Review (by teachers)

15. Review the problem and review it under more demanding conditions

Project Completion (by students) – Guidance & Evaluation (by teachers)

16. Repeat steps 5 through 11 with additional or new requirements as formulated in 15
17. Investigation - Case Studies - Expansion - New Theories - Testing New Conclusions
18. Presentation of Conclusions - Communication Tactics.

STAGE III: STEAME ACADEMY Actions and Cooperation in Creative Projects for school students

Title of Project: _____

Brief Description/Outline of Organizational Arrangements / Responsibilities for Action

STAGE	**Activities/Steps** Teacher 1(T1) Cooperation with T2 and student guidance	**Activities /Steps** **By Students** Age Group: ____	**Activities /Steps** Teacher 2 (T2) Cooperation with T1 and student guidance
A	Preparation of steps 1,2,3		Cooperation in step 3
B	Guidance in step 9	4,5,6,7,8,9,10	Support guidance in step 9
C	Creative Evaluation	11	Creative Evaluation
D	Guidance	12	Guidance
E	Guidance	13 (9+12)	Guidance
F	Organization (SIL) STEAME in Life	14 Meeting with Business representatives	Organization (SIL) STEAME in Life
G	Preparation of step 15		Cooperation in step 15
H	Guidance	16 (repetition 5-11)	Support Guidance
I	Guidance	17	Support Guidance
K	Creative Evaluation	18	Creative Evaluation