"Hope is the thing with feathers"
Poetry through the lens of computational thinking

A STEM Alliance – IBM SkillsBuild Lesson Plan

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Overview

Please summarize your Lesson Plan in 1-3 sentences. This will be used as a description when publishing your Lesson Plan on our websites and repositories.

This Lesson plan combines Computer science with humanities and encourages students in viewing poetry through a computational thinking lens.
Learners will reflect on Artificial intelligence's progression and growing importance in the labour market, but they will also be stimulated to compose a poem using two AI app: Verse by verse and Poem generator. Finally, they will investigate their texts and the emotions they convey by using a web-based application, Voyant Tools, and the IBM Watson™ Tone Analyzer, a linguistic analysis tool.

Key Elements

Overview	
Subject(s)	*List all the subjects that this Lesson Plan is intended for. If this is an interdisciplinary lesson, list multiple subjects.* Computer Science, Language, Literature, English as a Foreign Language, Economics.
Module(s)	*Indicate below which of the three IBM SkillsBuild modules your Lesson Plan addresses:* Digital Technology
Students' Age Range	15-17

Overview	
Preparation Time	Previewing videos, quiz and infographic before sharing them with students, takes about 60 minutes. Getting started with Voyant Tools, IBM Tone Analyzer, Verse by Verse and Poem Generator : 1-2 hour/s
Teaching Time	7 hours
IBM SkillsBuild Resources Used	*List here ALL links of the IBM SkillsBuild resources used for this Lesson Plan.* ***Please provide the links on the level of module units.*** *A history of AI* https://students.yourlearning.ibm.com/activity/URL-3F060E8E4C27 *AI Infographic* https://ibm.ent.box.com/s/tmzs52khq8dxtv0wjkz2fdg632m4qnpy *IBM Watson Developer Cloud Tone Analyzer* https://tone-analyzer-demo.ng.bluemix.net/ *What is artificial Intelligence* https://bundles.yourlearning.ibm.com/students/learn/#PZXXWZEREVVQ28K2 *Computers help humans. Human intelligence versus artificial intelligence* https://bundles.yourlearning.ibm.com/students/learn/#PZXXWZEREVVQ28K2/PZXVNYMJXJJZ6BP3
Online Teaching Material	*List here all the links of online tools, applications, and support documents that you will use during the lesson, such as: Padlet, Kahoot, Canva, Graasp, Google Classroom, Socrative etc.* Digital Time Line generator https://www.visme.co/it/creare-sequenza-temporale/ Online debate platform https://www.kialo-edu.com/p/f1355a6f-647c-4fb8-bab3-d204b2d9a33c/82235 Survey web tool *AnswerGarden* https://answergarden.ch/ Online quiz: https://ed.ted.com/lessons/the-turing-test-can-a-computer-pass-for-a-human-alex-gendler#review Poem online Generator https://www.poem-generator.org.uk/

Overview	
	Videos: *AI Explained in 101 Seconds* https://www.youtube.com/watch?v=zjeBGkS4L *The Turing test: can a computer pass for human* https://www.youtube.com/watch?v=3wLqsRLvV-c Verse by verse http://sites.research.google/versebyverse/ Voyant Tools https://voyant-tools.org/
Offline Teaching Material	*List here all the offline tools, such as: paper, glue, etc.*

Learning Objectives

Describe in some bullet points what you would like to achieve with your students by the end of the lesson.

- Students will be able to list jobs in AI sector and illustrate the diverse tasks associated with them.
- Students will explore the world of computational linguistics and Artificial Intelligence
- Students will reflect on AI generated poetry comparing emotions and feelings produced from human and machines
- Students will critically observe the results of text analysis offered by computational linguistics enhanced by machine learning techniques.
- Students will debate the new frontiers of AI

Lesson Plan

Describe here in detail all the activities during the lesson and the time they require. If you are using any external documents, please scroll to the end of the document and add them to the Annex. Add more rows to the table if needed.

Name of Activity	Procedure	Time
Ice breaker activity	Teacher gives students this AnswerGarden code asking them to answer on their devices the following question: "Do you think that machines, like humans, can learn and create?" Students are requested to shortly comment in pairs the answers they gave.	10 minutes

Name of Activity	Procedure	Time
Video watching task	Students view the video AI Explained in 101 Seconds (taking notes while watching. Teacher brainstorms key words/concepts from the video e.g. *smart devices, machine learning, deep learning, experiential devices, transformational technology*) and chooses "Artificial Intelligence" to reside at the centre of a concept map drawn on the interactive board. Then, he/she separates the class into groups: each group has to build out one portion of the map by expanding on key words related to the centre concept "Artificial Intelligence" and branching out from there. Groups will present their branches to the class and discussion can be elaborated as necessary. Students craft together an appropriate class definition for *Artificial Intelligence* after having explored the concept map.	30 minutes
Creating a Timeline of Artificial Intelligence	Students are requested to summarize the stages of AI's history described on https://www.historyofai.nl/ creating a timeline with Visme	30 minutes
The Turing test	Students watch the TED-Ed video "The Turing test: can a computer pass for human". To test video's comprehension, teacher launches a quiz (to take the quiz students have to create a TED-Ed account), students submit their responses using their own devices. Questions and answers are analysed with teacher's facilitation.	30 minutes
Online debate	Students are invited to join the online debate created on Kialo in order to discuss if they think it is possible for a machine to replicate the full range of human conversation without having human consciousness and experience. Each student is requested to express his/her opinion inserting at least one claim and commenting pairs' claims.	30 minutes
Argumentative short essay task	Students explore different types of AI by reading Computers help humans. Human intelligence versus artificial intelligence , then write a five paragraphs (introduction -1 paragraph, thesis, main body- 3 paragraphs, and conclusion- 1 paragraph) short essay (about 250 words) to express theiropinion focussed on these prompts: *It seems as if AI technology could influence every aspect of society. Can you conceive the chance of a computer imitating human intelligence? Think about how AI will effect society in your lifetime. Where do you think AI could make the most impact?In the case of an artwork/poem created using AI, can the artist still claim creative ownership even if the algorithm did all the work?*	60 minutes

Name of Activity	Procedure	Time
AI careers' exploration (web search and group discussion task)	Teacher shows students the AI Infographic and asks them to present their comments, questions and reactions to the most requested area of expertise in 2025 job's market (see slide n. 2). In slide n. 3 the major tech companies are mentioned: teacher provides students with devices with internet access to further research the AI careers that the listed companies offer. All information should be recorded on a worksheet to be discussed in groups of 4. Teacher asks groups to decide which AI career seems to be the most fascinating and why, students share their opinions.	60 minutes
Poetry analysis with Voyant tools workshop	Students get familiar with Voyant tools for poetry's analysis as follows: Teacher pasts into Voyant's input box a URL containing a poem from the Authors listed in Verse by Verse Application or, directly, the chosen poem's text. Then, he/she gives a 1 hour hands-on workshop to familiarize the student with Voyant Tools and provide a means for understanding the concepts of text mining. To stimulate reflections on Voyant Tools' use, teacher asks students these questions: • What are the most frequently used words in the text? • What words do not appear at all or appear infrequently? • Do any of these words represent any sort of theme? • Where do these words appear in the text, and how they compare to their synonyms or antonyms? • Where should a person go looking in the text for the use of particular words or their representative themes?	60 minutes
AI and Poetry: compose your own AI poem and take part in a slam poetry!	On the basis of the poem's analysis conducted with Voyant tools (frequent poetic words, commonest themes, most used expressions), students are requested to compose a poem using two AI App: Verse by Verse (according to the writing style of the American poets featured in the website) and Poem generator (they can work in groups or individually). Students share their poetry creations in a competition (*slam poetry*): teacher decides the winner by using this rubric in order to evaluate the pupils' performances.	30 minutes for composing the poems + 30 minutes for slam poetry

Name of Activity	Procedure	Time
Analyze emotions and feelings in you poem with IBM Watson Tone Analyzer	Students are requested to analyse the emotional tone of the poem they composed as previous task. They make matching each line with one or more of the following emotions: *analytical, confident, fear, joy, tentative*. Then they index the presence of this emotion in the line trough a number as follows: - 0, emotion is not present in the line; - 0.5, emotion is weakly represented in the line; - 0.75, emotion is present in the line; - 1, emotion is clearly represented in the line. Then, they open IBM Watson™ Tone Analyzer , select the option 'Your own text', enter their poem in the box, click on 'Analyze' and observe the sentence level results. - in the "Tones" table, they find the index measuring emotion; - in the "Sentence level" table, each verse is highlighted in the colour of the prevalent emotion. The intensity of the colour reflects the presence's level of the emotion in that specific verse: it can be less than 0.5 if the emotion is not present, between 0.5 to 0.75 if it is present but not particularly evident, greater than 0.75 if its presence is accentuated. Students notes down the results of this analysis and compare it with their assumptions.	30 minutes
Wrap up activity On IBM Tone Analyzer	As wrap up activity students fill the worksheet available as Annex 1. The students' considerations are shared in a further plenary session. To ignate discussion teacher asks: *Has your own perspective on the issues shifted? Reflect on the material and tasks you covered and have another try at answering the initial question (see Ice breaker activity). Considering everything you have learned over this time, can a machine create?*	60 minutes

Link to IBM SkillsBuild Lesson Plan (optional)

Please provide the link to the Lesson Plan on the IBM SkillsBuild Platform.

Teacher's Remarks

Add here your comments and evaluation AFTER the implementation of this lesson, if any.

This lesson plan combines creativity with computational thinking overcoming the classical and stereotyped borders between STEM and humanities. Students appreciated the creative use of technology mediated from poetry: they reflected on machine learning and Artificial Intelligence from a new perspective based on emotions and feelings that verses usually vehicle. Throughout this Learning scenario we have analyzed some complex issues surrounding the concept of 'newness', originality and authorship. We've also seen examples of how it is possible working within and pushing beyond the boundaries of these concepts.
The approach was student centred and the learners' level satisfaction, measured through informal interviews at the end of each lesson, has confirmed their engagement and interest for the topic.

License

About the STEM Alliance and IBM SkillsBuild

The **STEM Alliance** is an international initiative, coordinated by EUN, that brings together industries, education stakeholders and MoEs to promote Science, Technology, Engineering and Mathematics (STEM) education and careers to young Europeans and to address anticipated future skills gaps in Europe.
IBM SkillsBuild for Students and Educators is a free online platform that is designed to enrich the STEM and work-related curriculum for students (age 14+) at this challenging time while also providing professional development opportunities for teachers. Built using vetted open source and bespoke learning content, IBM SkillsBuild uses text, video and gamified assessments to engage students. The platform also provides teachers with content curation tools and a dashboard that allows the tracking of student progress.

ANNEXES (IF NEEDED)

A thorough and complete list of all the materials used will be asked from all teachers. Those materials will be cited as Annexes and they can be further cited in the Lesson Plan.

ANNEX 1: IBM TONE ANALYZER WORKSHEET

Assessing the emotions conveyed by your poem with IBM Watson Tone Analyzer

First Name:
Family Name:
Class:

For each verse of the poem you created, indicate in the first column, in correspondence with the verse, the emotions you recognized and in the second column those derived from the analysis carried out by IBM Watson™ Tone Analyzer.
For the emotions identified by IBM Watson™ Tone Analyzer, note down the corresponding index. Add lines if needed.

Title of your poem	**Your Analysis**	**IBM Tone Analyzer**
line.1		
2		
3		
4		
5		
6		
7		
8		
9		
….		

Compare, for each verse, the emotions highlighted by you and those detected by the IBM Tone Analyzer. In case of discrepancies, which terms or structures might have led to different results? Do you think the tool might have misunderstood something? If so, why?

Fill the table with the indices you have assigned to each emotion (1st column) and with those ones resulting from the analysis conducted with IBM Watson™ Tone Analyzer (2nd column)

	Your analysis	**IBM Tone Analyzer**
anger		
fear		
joy		
sadness		
analytical		
confident		
tentative		

Compare the indices. What differences can you observe? Which of the two analyses of text's tone do you consider to be the most correct in accordance with the meaning of the whole poem? Why?