COVER PAGE AND DECLARATION

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I confirm that this assignment is my own work, is not copied from any other person's work (published/unpublished), and has not been previously submitted for assessment elsewhere.

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1. Introduction

In countries around the world science is usually segregated into different topics like physics, chemistry, biology etc. The connection between these areas are often forgotten when they are taught separately and learners are not able to apply them to real life situations. Science encourages critical thinking and problem solving through investigating, exploring and questioning.

2. Important Concepts Learned from Assigned Reading

One of the very important concepts I have learnt from the assigned reading is the Public's understanding of science and that Science is not understood by everyone. Science should not only aim at the people who want to take it further but to the layman as well. This will help in understanding current world problems related to many areas like health, the environment, climate change etc.

Something else that stood out for me is that what is being taught at school seems abstract and irrelevant to one's daily life. The learners are not able to relate physics, chemistry, biology and mathematics to the real world. The reading mentions that learners fail to see that science is all around them and widely applicable in their everyday life. An example can be as simple as hygiene – the science behind keeping oneself clean, this can help in a crisis like we have just experienced, Coronavirus.

In the reading it clearly stood out that Science in school is aimed only for those who want to peruse it further and not for common public.

Traditional science curricula were designed to train specialists in specific areas. Now learners are going into all kinds of different careers and this method of teaching and learning is not suited to them. Learners should be able to take on any job.

Beyond 2000 mentions the use of models in Science - Although enormously powerful, models are rarely directly applicable to everyday circumstances and they are subject to massive uncertainty. Scientist us them within a limited range and making assumptions leads to error and incorrect data/information.

In **Reiss' reading** it is mentioned that most of the developed countries have a negative attitude towards science due to their distrust in it and that the underdeveloped countries are much more positive towards science perhaps because they view it in a different manner as they are exposed to different things.

Scientific Literacy is another concern – due to what is focused on or portrayed by the media leads people to form opinions or lean towards what is being highlighted by the media. If the public had a good and basic understanding, they would be more confident and inclined towards forming their own opinions based on their knowledge.

3. Utilization of key concepts learned, at and within the workplace contexts

Science education can offer a deep context for developing many of the 21st-century skills, such as mentioned previously - critical thinking, problem solving, and even information literacy, especially when it dives into the essence of science and promotes the use of science practices.

These skills not only contribute to the development of a well-prepared workforce for the future but it also gives the learners life skills that will help them succeed in life and in whatever job/career they decide to do.

Through a good quality science education, we can support and advance relevant 21st-century skills, while enriching science practice through infusion of these skills. It is essential, however, that good quality science education is not neglected and does not disappear in support of 21st-century skills.

A teacher should not create any pre conceived opinions about any topic. They should not impose their opinion on the learners.

Learners should be encouraged to develop their curiosity, explore, research and discover new things through hands on learning.

STEM/STEAM activities are a great way to include science in all areas of learning. In the Pre-primary and primary years the learners are really curious to learn, explore and find out more through STEM/STEAM. One such example could be making a Musical instrument using different materials. Instead of simply learning about vibrations, sounds and so in in theory. The learners get to explore and find out for themselves. They can learn through trial and error and come to their conclusions about sound.

Another method to encourage curiosity towards Science is to take the learners on fieldtrips where they can witness real life examples. Going to science museums will help them understand different scientists and their theories. Making the experience relevant and personal creates curiosity to learn and know more.

The reading also helps teachers understand what is required from them in order to make this change in teaching science. The resources and training required to enhance Science in schools. Tools, in the form of computer tools and abstract tools, make tasks easier and allow learners to take over tasks they would not else be suitable to do. Creating effective spaces for learners to work in, embodying crucial aspects of the disciplines of science, delivering effective and authentic chances for learners to learn, and easing a dialogue between learners' ideas and their experiences of the natural world. The ecology in which learning happens – provides three sources of information through the natural, social, and conceptual worlds. When crucial aspects of these worlds are manifested in the surroundings, they altar the literacy of science content, the nature of science, and the knowledge process itself, all of which are needed for the deep understanding of science that constitutes enhanced science literacy.

Being able to think analytically and quantitatively are very important skills that learners need to develop. This means they need to have the ability to visualize, articulate and solve complex problems and make decisions based on available information.

Learners want more ownership of their work. They want to experiment, make changes, come up with alternatives/new ideas. They do not just want to be taught and have to do experiments to prove what the "book" says.

4. **Potential challenges faced in implementing these concepts at the workplace.**

There are challenges for both the teacher as well as the learners when trying to implement the different concepts.

Below are a number of the challenges:

- **Fixed curricular** - The institute is most likely to have a curricular that has to be followed. The teacher has to stick to this curriculum and this limits him/her to explore different methods of teaching and therefor doing things differently.
- **Adequate Training -**The facilitator/teacher does not have the required training to teach science in a different way. They might want to teach in more exciting and meaningful ways but don't know how to.
- **Changing the mindset -** The facilitator/ teacher is comfortable with what is in place and does not want to do things differently. It becomes difficult to change their thinking and way of teaching.
- **Assessing the quality of data –** it changes and scientists/educators have different viewpoints. There can be multiple interpretations of science.
- any such new curriculum would require a significant loss of more traditional curriculum content.
- **Questioning -** The learner is not confident enough and/or encouraged to ask questions. They are not given the freedom to explore at their own free will. Science education is supposed to encourage an inquiring mind. But in school the opposite is done – the teacher/facilitator is just teaching what is in the "book".
- For learners might find it challenging to **keep an open mind and remain independent from public opinion.** Often their views and opinions are changed due to what to teacher/facilitator feels about a topic.
- Learners need to be knowledgeable about the world around them and aware of how nature works. This means they have to make an effort to find out about what is

happening in the world, keep themselves up to date with the current affairs. Some might find this challenging.

- The constant **advance and changes in technology** makes certain methods meaningless and useless in today's age. It is important to keep oneself up to date with the technological changes around us and make learners aware of the same.
- **Assessment methods** - there needs to be an assessment system that manages to reward the learning that we really value is something that still needs to be worked upon and included. How will the learner be assessed needs to be carefully thought through and changed accordingly.

In Coles reading it says that when Learners are taught facts, principles and skills in situations that are not related to those where they will be applied, the learner has difficulty in transferring their abilities. Scientific work settings are not available to most students and therefore it can be expected that, while some learners have learned useful science in school or college, they will have a problem applying it in practice. **(Coles, 1997).**

The work of Thomas Kuhn indicates that, once a scientific theory or paradigm becomes established, scientists as a community are slow to change their thinking. Pupils, like scientists, view the world through the spectacles of their own preconceptions, and many have difficulty in making the journey from their own intuitions to the ideas presented in science lessons. **(Driver, 1983, p. ii)**

5. Conclusion

In conclusion I have learned that teaching science, technology and engineering skills for the real world has never been more important. If we want our learners solving the world's biggest challenges, we cannot keep outdated educational systems. There should be no preconceived

notions and the learners should be allowed to question, explore and come up with their own conclusions.

We must align public policies and investments in education, science and technology to develop 21st century skills in young people to prepare them for a changing future.

In order to inculcate this into the learners it must start from a young age, as young as the early years, and a starting age should not be set. As a teacher I need to keep myself up to date with what is happening around the world and continue to upgrade my skills.

6. References:

- https://www.weforum.org/agenda/2020/08/science-education-reset-stem-technology/
- https://www.nsta.org/nstas-official-positions/quality-science-education-and-21st-century-skills
- Beyond-2000-science-education-for-the-future
- Effectiveness of Science Learning
- Changes in Science education - Open Learn
- 21st century skills
- Coles, M. (1997) 'Science education – vocational and general approaches', *School Science Review*, 79 (286).
- Beeth, M.E. & Hewson, P.W. (1999). Learning goals in an exemplary science teacher's practice: Cognitive and social factors in teaching for conceptual change. *Science Education, 83*(6), 738–760.
- Bransford, J., Brown, A.L. & Cocking, R.R. (2000). *How people learn: Brain, mind, experience, and school*, expanded edn. Washington, DC: National Academy Press.

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Statement of participation

Serene Fallon Wentzel

has completed the free course including any mandatory tests for:

Changes in Science Education

This 20-hour free course looked at the type of science that the current curriculum should be covering, be it at primary, secondary or tertiary level.

Issue date: 4 August 2022

www.open.edu/openlearn

This statement does not imply the award of credit points nor the conferment of a University Qualification.
This statement confirms that this free course and all mandatory tests were passed by the learner.

Please go to the course on OpenLearn for full details:
https://www.open.edu/openlearn/education-development/education/changes-science-education/content-section-0

COURSE CODE: **SEH806_1**

Changes in Science Education

https://www.open.edu/openlearn/education-development/education/changes-science-education/content-section-0

Course summary

Providing an overview of current issues in UK science education, Changes in Science Education is a free course that examines what type of science the curriculum should cover and for what purpose. It will introduce you to the practical problems of delivering an effective science curriculum, touching upon particular questions at all three educational tiers - primary, secondary and tertiary.

Learning outcomes

By completing this course, the learner should be able to:

- demonstrate an understanding of problems associated with defining the Nature of Science
- write in an informed way about the purposes of compulsory science education
- be aware of the educational complications and implications associated with the phrase 'the public understanding of science'
- show an ability to comment critically on curriculum proposals that aim to promote science citizenship/scientific literacy
- provide examples of how specific scientific understanding might be used by lay individuals in a practical context.

Changes in Science Education

Completed study

The learner has completed the following:

Section 1

Course overview

Section 2

What is science?

Section 3

Problems of teaching the Nature of Science

Section 4

Who is science education for?

Section 5

Education for democracy?

Section 6

The public understanding of science

Section 7

A way ahead? – Beyond 2000

Section 8

What are the chances that scientific literacy will prevail?

Section 9

Evidence of progress?

Section 10

'Science for all?' A look at some contexts

Section 11

Primary science

Section 12

Science in secondary schools

Section 13

Post-compulsory science education

Section 14

Conclusion

COURSE CODE: **SEH806_1**