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For us to explore how inquiry based learning may beincorporated in to SESE curricular areas we must first investigate and clearlydefine what is meant by inquiry based learning. This essay will then examineand debate the advantages and disadvantages surrounding this approach and itscomparison to problem based learning. Inquiry can be defined as a seeking oftruth, information, or knowledge by questioning (WNET). Inquiry based learningis a process that is a lifelong skill, unbeknownst to most of us, that we mustdevelop in school. Infants begin to make sense of the world around them throughinquiry based practices. Babies observe faces that come near, grasp objects, put objects in their mouths, and turn their heads towards voices. This formsthe foundation of the inquiry based learning process by gathering informationthrough the use of human senses; seeing, hearing, touching, tasting, andsmelling (WNET).

This natural instinct within us all must be capitalised uponto effectively incorporate an inquiry based learning approach into STEMsubjects. This approach may serve to underpin high levels of studentengagement, enjoyment, and excellent performance in STEM disciplines (STEM2016). Inquiry-Based Learning shifts the focus to curiosity andobservations, which are then followed up with problem-solving andexperimentation. Using critical thinking and reflection, students connectmeanings from collected evidence and data, leading to an understanding and senseof the natural world around them. Compared to problem based learning, whereproblems are posed in such a way that students need to seek new knowledgebefore they can solve them, inquiry based learning provides a more activealternative. Rather than simply seeking a single correct answer, students areenabled to interpret the problem, gather the information needed to identifypossible solutions, and then evaluate options and present conclusions. Therevised curricula in SESE allows a timely opportunity to introduce this new wayof teaching, learning and assessment methodologies to enhance STEM education(STEM Education Review Group, 2016).

This approach is flexible in that itallows the teacher to design different learning environments along an inquirycontinuum that best fits the context of the learning situation (Banchi &Bell, 2008).   Bianchi & Bell (2008) consider open inquiry to be thehighest level of inquiry. This allows students to have the best opportunitiesto act like scientists in a SESE setting. Students are active in lessons andare encouraged to derive questions, design and carry out investigations, andcommunicate their results to each other and the teacher.

This level requiresthe most scientific reasoning and places greatest cognitive demand on students(Kuhn, 2005). Inquiry-based learning can help make connections within subjects throughoutall SESE disciplines and the wider curriculum. Teaching specific content suchas photosynthesis in science has more relevance for the learner if set in alarger context of understanding. Students must understand the relationship of the sun, plants, andthe role of carbon dioxide and water.

History content, such as the industrialrevolution, set in the context of interrelatingchanges in the human-designed world can add new perspectives to thisimportant natural process. Students can still learn the content of both scienceand history, but through a series of well-planned experiences, they will graspthe larger conceptual context and gain greater understanding of both (Mezirow, 1991). Within a conceptual framework, inquiry based learning and active learnerparticipation can lead to important outcomes in the classroom.

Students whoactively make observations, collect, analyse, and synthesize information, anddraw conclusions are developing relevant problem-solving skills. These skillscan be applied to future situations that students will encounter both at schooland in the workplace (WNET). The advantages of inquiry based learning lie in itsflexibility and its adaptable nature for a variety of projects. Allowingchildren to partake in this approach helps to build self-esteem and confidence byallowing them to be more active in their own learning process as opposed tobeing a passive participant to the teachers’ lesson. Another major advantage isthat this approach can work with any age group within a primary school settingand it serves to reinforce and build student skills from a young age (Gardner, 1983).

This approach also builds and reinforces skills of students in the areaof physical, emotional and cognitive function. While there are many advantagesto this approach, it is important to balance the argument and exploredisadvantages relating to inquiry based learning. It is important to point outthat this does not work for every SESE lesson. From a teachers’ point of view, it involves far more planning and preparation, thus taking away importantplanning and preparation time from the teacher. This approach can also be rathertime consuming and may take away vital time from other subject areas within theschool day (WNET).

Through the process of inquiry, individuals construct much oftheir understanding of the natural and human-designed worlds. Inquiry is not somuch seeking the right answer, but seeking appropriate resolutions to issues andquestions. For educators, inquiry implies emphasis on the development ofinquiry skills and the nurturing of inquiring attitudes or habits of mind thatwill enable individuals to continue the quest for knowledge throughout theirlives. The knowledge base for disciplines is continually evolving (Gardner, 1991). A primary school pupil cannot simply learn everything, rather, they candevelop their skills and foster the inquiring attitudes necessary to continuethe cultivation and examination of knowledge throughout their lives. In moderneducation, the skills and the ability to continue learning should be the mostimportant outcomes. While much thought and research has been spent on the role ofinquiry in SESE, inquiry learning can be applied to all disciplines (WNET).

This inquiry based practice transforms the learner from a passive to an activeparticipant in the learning process. The teacher also moves from being anisolated subject expert to an instructional leader and learning architect forfull pupil involvement. The goal of this approach is to improve learning bydeveloping more self-sufficient learners who become increasingly responsiblefor their own learning. The vision, as pointed out in the quote to provideIrish students with a STEM education experience of high international qualitycan be attained in Irish primary schools, while underpinning high levels ofstudent engagement, enjoyment and excellent performance in the various ways pointedout in this essay.