ENSPIRAL – ENhanced Solution for Project and Interactive Research-based Applied Learning

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Abstract

Like all other educational approaches, design teaching, is moving towards the usage of E-Learning, as to enhance the learning experience. Nevertheless, it is of significance to present this as part of a blended solution, combining learning materials, interaction with experts and fellow learners. Using technology and E-learning as part of a curriculum, in return will assist and help build the process of lifelong learning, as is indicated in the Lisbon goal.

ENSPIRAL has the prospective to stimulate learning arrangements, experimental environments and problem solving environments. Its approach is based on a set of fine educational methodologies that remain the base of the design of the complete learning process. The correct educational approach is the major influential factor, when designing E-learning, for the learner's success, specifically for subject areas such as Interior and Graphic Design. The typical questions of hard- and software when designing E-learning, should change and rather focus on the most appropriate educational methodology to be implemented.

ENSPIRAL – takes E-learning to be more than just E-content, it involves presenting the concepts of design through different aspects of learning, such as project and research based learning. In return, this applied approach; focuses on experimental learning, giving the opportunity for the learner to progress through reflection on accomplishment, adventure learning and cooperative learning.

ENSPIRAL is aimed to assist the development of E-content as effective learning, by ensuring that the entire learning cycle is enclosed from an objective setting, research and examination, evaluation and reflection on the knowledge gained. This allows the learner to acquire and apply analytical skills to assist in conceptualising the content. Through ENSPIRAL the learner builds decision making and problem solving skills, in order to apply the new ideas gained throughout the learning process.

1 Introduction

ENSPIRAL aims to unify education, curriculum, learning theory, and the purpose of teaching by allowing the learner to "spiral" through information, interactively building his/her knowledge through a project/research based approach.

ENSPIRAL is anchored on a set of educational methodologies that outline the solid foundation for the creation of the complete learning process. Built on this foundation are two modules, teacher and technical components, essential for completing the learning cycle. These modules produce an environment with objective settings through research and examination, evaluation and reflection on the knowledge gained.

2 Enspiral Model

2.1 Enspiral - Educational Approach (Dewey)

Dewey made a strong case that the purpose of education should not revolve around the acquisition of a pre-determined set of skills, but rather the realisation of one's full potential. Through ENSPIRAL, a learner has the option to link not only the specific subject matter, but also to link to other subject areas related to topic areas that overlap (Figure 2). In The Child and the Curriculum (1902) [1], Dewey argued that the key flaw in curriculum centred teaching is the inactivity of the learner, and to increase the effectiveness of education, content must be presented in a way that allows the learner to relate the information to prior experiences, thus deepening the connection with this new knowledge.
Dewey advocated for an educational structure that strikes equilibrium between delivering knowledge while also taking into account the interests and experiences of the learner. Dewey's ideas lean towards Project Based Learning (PBL) which places learners in the active role of researchers. [2]
By adapting Dewey's approach to the environment of E-content, the framework should not just present information to be absorbed in a passive manner, but instead, should be that of catalyst that through the learning process, guides learners to independently discover meaning within the subject area.

2.2 ENSPIRAL - Educational approach (Kilpartick and Papert)

Kilpatrick perceived the project based learning to be the procedure of progressive education that engage applied learning that are designed to develop initiative, creativity, and judgment [3]. Kilpatrick based his project perception on Dewey's theory of experience. [4] In Kilpatrick's view, projects have four phases: purposing, planning, executing, and judging. This approach Dewey asserted can only be effective if the learner can be taught to go through the "complete act of thinking", that could expand their experience and broaden their education. [5]
Project based work brings forth independent thought and development, combining theory with practice; it does not rely on an empirical or hermeneutical approach, but on "construction". Seymour Papert [6] developed an original and highly influential theory on learning called constructionism. He built upon the work of Jean Piaget in constructivism learning theories.
ENSPIRAL consecutively build upon the ideas and process suggested by Kilpatrick for project based work, but as Dewey, regards project work, as only one of many methods of teaching. [7] ENSPIRAL envelopes project based learning with a constructionism approach, allowing the learners to draw their own conclusions through creative experimentation. E-content is built not to only teach the learners, but assisting in the comprehension, research and assistance of one another to identify through problem solving.
Papert [8] associated learners learning to a living in a "mathland," where learning mathematical ideas is as natural as learning French while living in France. This approach is integrated in particular through ENSPIRAL for the subject areas of graphic design and interior design, by the implementation of a "paper world" and a 3D city, where learners can learn through constructionism, based on project and research. Another such an example is the application of Papert's philosophy of "Constructionist Education" to the popular game SimCity as a means of teaching English using constructionist techniques. [9]

2.3 Enspiral - Teacher And Technical Modules

The ENSPIRAL model includes two distinct parts. These include the teacher's module and the technical components module. The module of the teacher, offers guidelines in the form of a lesson plan template that assist the teacher in the correct methodology (based upon the educational approach supported by ENSPIRAL) in developing blended solutions. The technical components and guidelines are linked to the lesson plan created; describing the various learning objects/learning environments to be used in the E-content development.
The ENSPIRAL model can be seen in Figure 1. This model is based on the mathematical spiral that is derived from a specific sequence which is found everywhere in nature. The model itself is a spiral is known as the golden spiral, as it depicts a specific ratio which is a foundation in nature and in the

design of the space we live in. The ratio follows a simple pattern, in which a sequence grows in such a way that it is ever increasing and increasing to an amount equal to the sum of its previous two amounts. In a similar way, the ENSPIRAL model introduces a new progression in education, which counters the usual sequential or linear education with a sequence known as the Fibonacci sequence. Dewey noted that "the child and the curriculum are simply two limits which define a single process. Just as two points define a straight line" (Dewey, 1902, p. 16). This widely applied educational approach achieves goals and targets at enhancing the learner's knowledge from one step to the next.
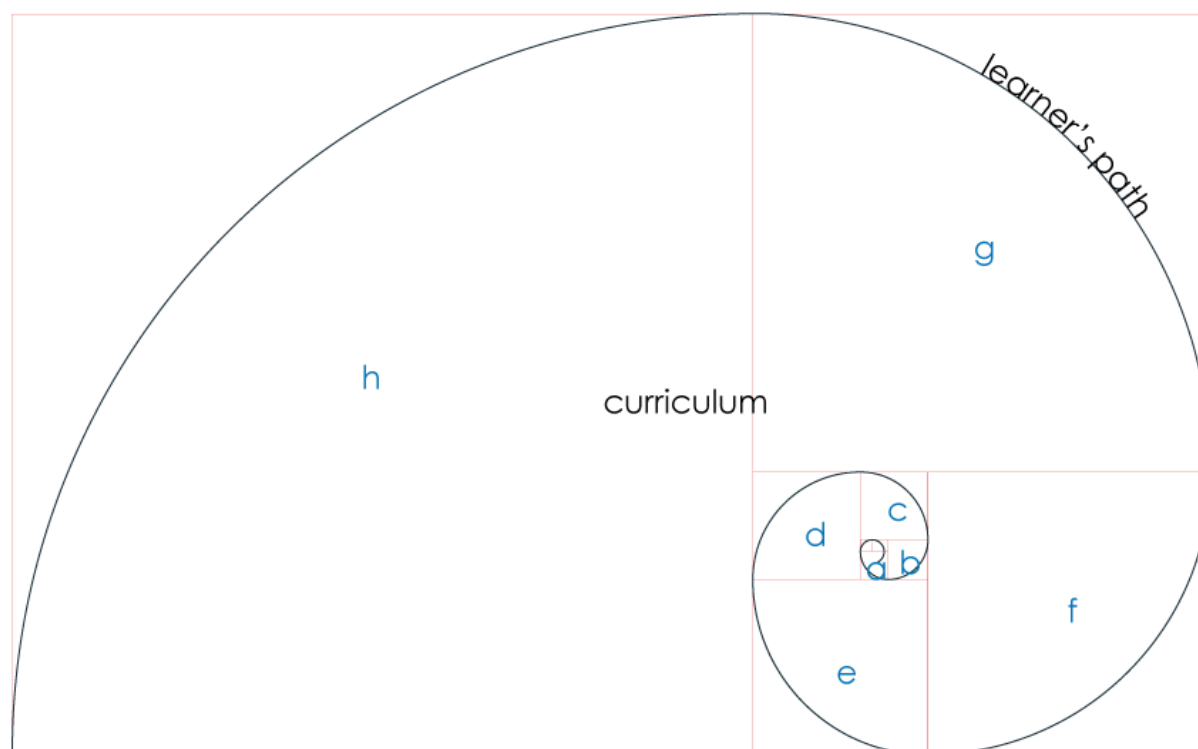

Figure 1 – ENSPIRAL model

Numerically depicted, this means the learner initiates at a starting point of 1, then learning linearly and growing to 2, then to 3, then to 4 and so forth. ENSPIRAL's methodologies target to build upon existing knowledge, and through project and research based learning, build upon this knowledge and leverage the learner to a level of understanding and knowledge equal to the sum of the learner's past experiences and newly gained knowledge. Numerically depicted, our learner initiates at 1, progresses to 2, then to 3 and starts spiralling out to 5, then 8 and grows beyond the curriculum, crossing other subject areas, covering topics more in-depth and has an unlimited possibility of progression.

Table 1, indicates the mapping of the teachers guidelines and technical components to the different parts of the ENSPIRAL model.

ENSPIRAL model	Teacher's modules guidelines to lesson plan	Technical modules / components and guidelines
a. Problem statement	Open-ended driven question Challenge question Providing interest related information followed with research based question Assessing learners' current level of knowledge on the new topic areas introduced	Animations Questions Videos Discussion topics Evaluation activities

b.	Comprehension	Core knowledge unit Knowledge introduction Interactive content that engages the learner to gain knowledge till a level that will allow them either to continue the lesson plan or to a level that can spiral out to other areas of interest, curricula and content.	Interactive E-book Intelligent metadata Visual breadcrumb which shows all active and past paths Hyperlinks leading to content or alternative lesson plan Interactive multimedia
c.	Virtual Environment	Envelope into the environment of the topic area, by applying the knowledge gained so far, in solving "real life problems, through research based approach.	Virtual subject related interactive space Navigation through virtual space Games Experiments
d.	Creativity	Teacher introduces creative appliance of knowledge gained This part allows the learner to apply the research done	Simulations Games E- portfolio
e.	Inquiring / interacting	Investigate preset values Investigate/inquire/reflect	Different types of evaluation activities based on research based approach
f.	Problem Solving / Critical Thinking / Collaboration	Communication with other peers problem solving, decision making, investigative skills, and reflection that include teacher facilitation	Different types of evaluation activities based on research based approach
g.	Research	Introducing project through mediation, indication purposing and planning of project through research	Project module part 1
h.	Project	Executing / building / evaluating realistic solutions or presentations through project based work either as individuals or groups peer review incorporates feedback and revision	Project module part 2

Table 1

3 Applied in design subjects

The ENSPIRAL model has been implemented and tested in the design subject areas of graphics and interior.

3.1 Enspiral – Graphic Design

Graphic design as part of a blended solution does not only require to be creative, but also to be intuitive, interactive. The learner must have the capability to create an E-portfolio, which can be accessed through a personal space, as well as made available for peer review. The depth and broadness of the subject area allows a learner through "spiralling", a self- discovering process of knowledge, interest and talent.

The learner is introduced to the topic area through a paperworld where character takes the role of introducing the learner to each part of the curriculum through an animation related to the area that will be covered. The learner's comprehension of the subject area then "spirals" through the paperworld, where the learner can interact with the virtual environment. Navigation can lead the learner to animations explaining concepts, simulations that apply new techniques learned and videos explaining subject matter. Form here the learner will be able to research and through project based work (group or individual) apply the new knowledge gained or add to already existing knowledge. Critical thinking and collaboration are enhanced through research based questions.

3.2enspiral – Interior Design

Interior design as part of a blended solution, requires an approach where the learner gets to "live in the world" of design, in par with developing an understanding of design and its influences. The content needs to connect to an overall approach, allowing the learner to reflect back, compare as well as interact and share ideas with fellow learners.

The learner's intrigue is met with real-life references of well known designers and design concepts through interactive multimedia, which follows with open-ended research driving questions. The learner has then the option to start at any point of the core content, again "spiralling" through the content in a depth needed to gain the appropriate knowledge to continue. As from the first lesson the learner applies the knowledge gained on a virtual 2D/3D house. This virtual house evolves in synchronisation with the learner's knowledge growth. Problem solving, critical thinking and collaboration modules are included too stimulate the learner's research and presentation skills.

Different projects are initiated through the different lessons plans that make up the entire curriculum, which include the designing of an exhibition hall, a shopping mall and an office building through a multi- user interactive environment.

4 Conclusion

ENSPIRAL provides guidelines that intend to assist the development of E-content as effective learning, by ensuring that the entire learning cycle is based upon a solid educational methodology. The intelligence of ENSPIRAL relies on its ability for the learner to "spiral" at his/her own pace, "spiral" into other related subject areas, "spiral" form any part of lesson to other topics of interest, starting again at another point of interest/previous knowledge.

In conclusion ENSPIRAL's objective is to support the learner in exploiting innovative ideas based on the content learned, not minimally reiterate what was understood.
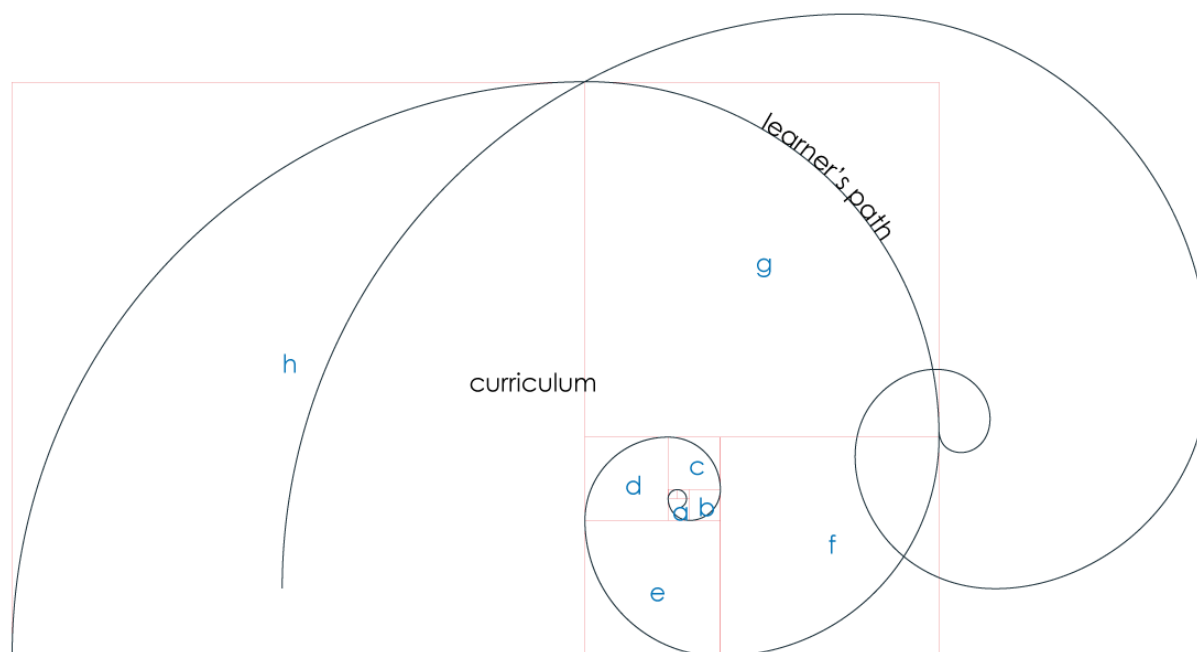

Figure 2 – ENSPIRAL model "spiralling" out to another path

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