

A Workshop on the Use of an Interactive Multimedia Environment for Learning the Basics of Network Diagram Construction in Project Management

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Abstract

Constructing a Network Diagram using the Critical Path Analysis methods is an important task in planning a project systematically. For details of Project Management, see Burke (2010) and Gido and Clements (2012). This task involves some basic and very practical mathematical modeling in determining the total project time; the earliest and latest start and finish times for activities; and the critical activities which constitute the Critical Path. Hence, procedures such as forward and backward passes would be necessary in these calculations. The interactive multimedia environment presented in this workshop has been based on an approach developed, tested and taught by the author for several years. The approach is structured on the three main phases of Formulation, Solution and Interpretation. In recent years, this approach was incorporated into a multimedia environment. It was then made available as an application for students to download and use it to simulate a typical face to face lecture on their chosen device at their chosen time. The learning outcomes have demonstrated the system's effectiveness.

Key Words: Network Diagram, Interactive, Learning by Guidance, Basic Mathematics

Introduction

This workshop consists of an introduction to the main features of the interactive multimedia system developed by the author and his team. See Nooriafshar and Todhunter, 2004. After the brief insight into the purpose and features of the interactive system, the concept and methods of developing a Work Breakdown Structure (WBS) are introduced. Using the media-rich features of the system, a WBS is created for a chosen project management example. The presentation then moves on to formulation of the problem by constructing a network diagram. All the

necessary explanations are provided in audio, text and animation. So, the user has a choice in selecting the preferred modes of learning. The solution phase is then introduced by demonstrating, in a step by step manner, how the calculations for the forward and backward passes are carried out. The interactive system, in a subtle and deliberate, manner presents the necessary mathematics in a very practical and easy-to-understand fashion. After the solution phase, the interpretation phase shows how one can carry out what-if-analysis. At this stage, the learner can interact with the system and experiment with different scenarios.

Main Features

This interactive multimedia environment consists of Introduction, Work Breakdown Structure (WBS), Network Diagram, Gantt chart, Gantt chart Examples and the Glossary of the terms used. The audio visual lectures in the tool are complemented with dynamic images which are drawn and completed in a step by step manner. Rendering the graphics is fully synchronised with the background audio. Hence, the learner can grasp the concepts both by seeing and hearing. In addition to these main modes of learning (visual and aural), a transcript of the lecture audio is accessible through clicking a tab. As a result of this rich combination of modal preferences, the learning experience is enhanced. The learner also has full control over which modes should be included in the session. The session can be paused or repeated as the learner wishes at any time. Therefore, the learner feels as if they are sitting in the driver's seat and controlling the learning session to suit their needs. The learner can also interact with the charts such as the Gantt chart and perform what-if analysis. As a result, a full set of all the different modes of visual, aural, text and kinesthetic are included. For details on the use of different modes of learning, see Fleming (2011).

This interactive environment is a typical example of adopting learning by guidance with the additional features of allowing the user to have control over the selection and of the use of learning modes (visual, aural, text and kinesthetic).

Over the years, this system was tested with different groups of students from Australia, Japan, Portugal, Mexico, USA and Canada, The test was undertaken after the conclusion of the workshop in every case.

The students' feedback and answers to questions related to the forward and backward passes and the network construction, demonstrated their understanding of the basic mathematics involved in the process.

Conclusions

Based on all the previous students' performance in the test case study component of the workshop, it has been established that this interactive multimedia system has the potential for effectively learning the basic mathematics involved in construction and interpretation of Network Diagrams. Therefore, it was shown how learning could be assisted by guiding the learner to find the right solution so that the learner could gain a sense of achievement which leads to satisfaction and encouragement for further learning.

References

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