

Name of candidate: Abdul Wahid
Name of Super visor: Dr. Khurram Mustafa, DCS, JMI
Name of Co-supervisor: Dr. P L Maggu, GSBA G. Noida
Department: Computer Science
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ABSTRACT

This study was undertaken in view of the need and significance of teaching computer programming through highly acclaimed web based instruction instructional systems. In the first instance it was considered necessary, in the absence of any standard framework, to propose a framework for the Web Based Instruction for Computer Programming. Consequently, a review of related literature on Web Based Instruction, their development methodologies and Programming models was undertaken. It was clearly revealed that the available programming models do not fulfill the needs in the Web based Instruction (WBI) environment and vice-versa. Apparently there appeared a need and scope for having a fresh look into the special case based notion of 'teaching computer programming through web based instructional systems', and hence evolving new Web Based Instruction based Programming Instruction System (WBI-PIS). However, it appeared feasible to design and develop Web Based Instructional System for Computer Programming (WBIS^{CP}) by integrating results from different WBI environment as an expertise component. It was also considered necessary to evaluate the contextual performance i.e. its effectiveness for learning attainment while teaching programming.

The current research is quasi-experimental in nature with three components, each encompassing analytical study, development and validation tasks in one or the other form. The first major component referred to as the Development of the conceptual framework, which has been accomplished through literature survey, gathering opinion from experts, validation and review. The second component of the study, i.e. development of WBIS^{CP} framework has been accomplished through several phases including review of literature, consultations and review. The process component provides

the macro-level from conceptualization to distribution of end-product. There are also micro-level guidelines on the attributes prescribed by process component. The framework has been implemented using ATHORWARE PRO for the purpose of validation

Finally the evaluation of effectiveness of framework has been accomplished through several phases including procurement of sample packages, development of model WBI-PIS package and measuring tools, experimentation and statistical analysis of data. The experiment was designed to be a two-group pretest-posttest design with one experimental and one control group. Data was collected through criterion tests Module rating scale and an open questionnaire. Primary experimental results were analyzed and accomplished using ANCOVA. Supplementary data was also analyzed using suitable techniques. Statistical inferences, revealed generally positive results in favour of WBI-PIS for attainment, both at achievement as well as predictive levels. Subjects on whole, has positive attitude towards all two packages and highly optimistic about framework based WBI-PIS package.

The researcher has come across several findings with regard to the different components of the study. Major finding included development of a prescriptive framework WBIS^{CP} for teaching computer programming, organized to facilitate the guidelines on various phase such as conceptualization, design development and implementation. However, the typical evaluations of effectiveness of WBI-PIS, generally based on statistical analysis, yielded the following results:

- The WBIS^{CP} based WBI-PIS in general, facilitates better computer programming learning gains.
- The WBIS^{CP} based WBI-PIS in general has higher predictive value than non-WBIS^{CP} based package.
- Learners are generally more cautious about the learning environment than the content material being taught.
- Learners have generally a positive attitude towards e-learning and highly positive towards the WBIS^{CP} based PIS.