Abstract:
The exponential growth in the development of the Information and Communication Technologies over the last decade has provided numerous opportunities to the human, and one of them is education. Unfortunately, most of the research studies on technology enhanced or computer-assisted learning (either through 2D applications or 3D virtual worlds) to-date seem to target mainstream education. Few serious attempts have been made to exploit computer-assisted learning platforms for the adult literacy. On the other hand the resources that are customized for the basic education are either text dominant or classified for children. The text dominant resources are again suitable to the functional illiterates, and the resources classified for children are rarely inspiring the adult absolute illiterate for their basic education. These indicators argue to design the customized learning platforms for the adult basic education (ABE).

This thesis revisits the learning theories to select the features important for adult learners in ABE programs, and choose appropriate technologies that can provide the selected features. Consequently on these bases, architecture is proposed to realize the computer-assisted learning platforms customized for the ABE. Exploiting the proposed architecture a learning platform is implemented using 3D virtual world as it can offer more features selected from learning theories. Later on, evaluation and comparison of the realized learning platform is carried out. For comparison 2D web-based applications are designed and implemented for the ABE. Furthermore, adaptivity in 3D virtual worlds for multi-user is an issue. In multi-user 3D virtual worlds, as the same 3D space is shared by more than one user simultaneously, adaptive content presentation and navigation are two major challenges. To address these challenges, an approach for adaptive content presentation and navigation in 3D virtual world for multi-user is proposed, and implemented as an extension of the designed and developed platform for the ABE.

In order to find impact of both 2D and 3D learning environments on the learners of ABE program, an empirical study was conducted in Pakistan. The findings were quite promising. The proposed 3D learning environment had good impact on the learning gain of the learners, it positively influenced more intelligences of the learners than 2D learning environment, and the learner were more satisfied to work in 3D learning environment as compared to 2D learning environment.