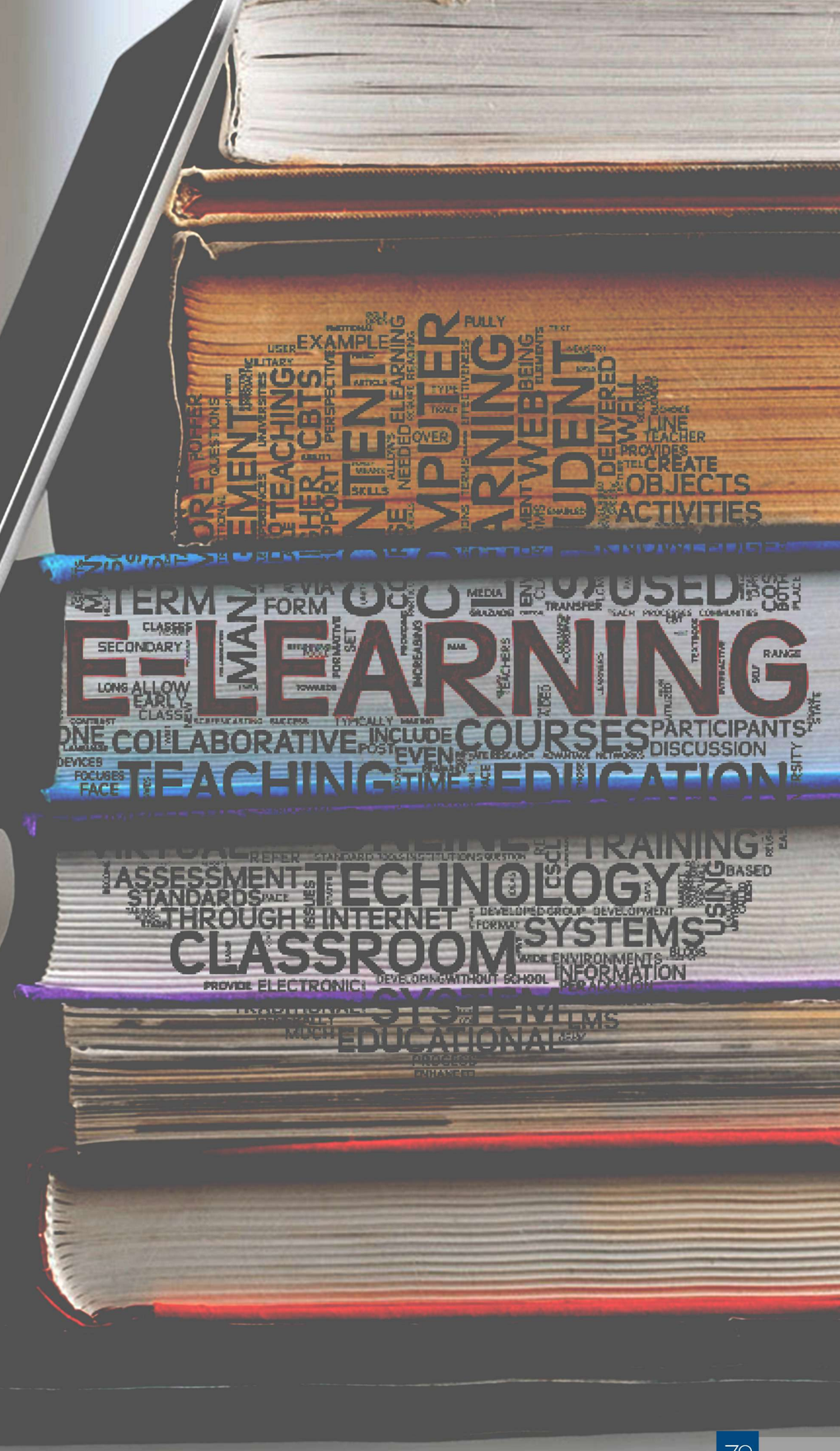
ELG

E-LEARNING CROUP

elg@bahria.edu.pk

E-Learning Research Group aims to introduce a uniform learning environment in our country's basic education system which includes lectures, practice material and assessments in electronic format. One of our projects, e-learning system for elementary education, delivers computer based lectures developed from paper based curriculum and activities and assessments in the shape of learning games for students to learn while playing. We also provide a response analysis engine for early identification of psychological disorders and a measure about the I/Q and E/Q of each student. Our research and range of solutions provide assistance at various levels of research and development of learning and education.



RESEARCH & SERVICES PORTFOLIO

Qalum Guru - An early Education Assistant

We aim to introduce a uniform learning environment in our country's basic education system which includes lectures, practice material and assessments in electronic format. This e-learning project delivers computer based teaching material consulting the latest research and current best practices in leading private schools of the country. The System embodies, E-learning Module containing lectures, practice sessions and assessments. Students' response and behavior analysis were made with the help of E-Learning Module for early identification of learning disorders (LD) which includes reading, writing, coloring, IQ generally coming under the umbrella of dyslexia, dysgraphia and dyscalculia. A uniform system of education can be introduced in the whole country through the provision of E-Learning material to schools established at remote areas targeting low income community. The project is implemented in schools where around 1000 students are studying using our online system available at http://www.qalumguru.com. The system can be extended to make offline assessment system which can be helpful in conducting the assessments in the same manner that are available in the online version.

Emotions Analysis

Emotions have a strong impact on behavior. During face to face interaction, emotion can be judged through non-verbal behavior, but in e-learning, it is challenging. We provide audio as well facial data analysis engine to predict student's behavior and help teachers to provide assistance accordingly. The system extracts linguisti as well as prosodic features. The system uses words and other features like pitch as these solely could not be as accurate as required, for example, if a student is happy or excited, his pitch is high and also if he is angry, his pitch is also high so we are using words, and on the basis of their combination we would extract the emotions of students. Also, the system tag students' emotions for historical data. Said system does emotions' analysis from facial extraction/gesture where data is collected through a camera attached to each workstation. We identify behavior of students during his study period to analyze their interest towards towards a particular subject. Moreover, we identify after what time during studies a student loses interest in a particular subject and learning gets slower and sometimes stops. Our proposed solution consists of system attached with camera which is to record the video of students. Our objective of getting regular pictures of classrooms and record emotions of students while learning a subject. We label emotions of student using our application and record them.

Paper-based Data Analysis for Psychological Disorders

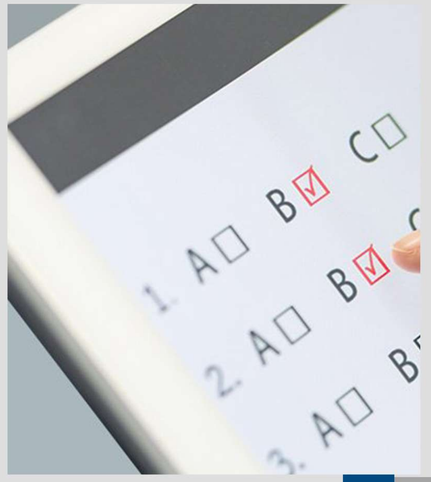
Dyslexia-reading disability is characterized failure to develop appropriate reading skills. Dysgraphia-writing disability affects writing abilities where difficulties pertaining to spellings are most common. We have developed an application to assist instructors by taking the snapshot of the child worksheet with camera. These classes express different segments of mindsets and they help us in evaluating the behavior of students towards dyslexia. Our system processes that image by tagging it to certain class that is drawing and evaluates the perception of student regarding the object. Our approach focuses on finding differences between the captured image of the characters and alphabets with respect to the actual data stored in the database. For the third class students are given unfilled drawings. Pictures of filled worksheet serve as an input. Focus is on whether the students are able to color, right scheme to the object. This helps us in identifying the child who is suffering from the above mentioned disorders. Not only the personality assessment discussed above, the same data helps find out a number of other issues

Achievement Tests for verifying Stunting in Students

Studies have shown that early students stunting cause is normally associated with performance of children.-Scholars estimated that stunted student achieve 16.1% in Peabody picture vocabulary test and 48.8% in quantitative test. For assessment, we not only use an indigenous reading, writing and arithmetic assessment based test but we have also implemented it based on Item Response Theory (IRT) principles. IRT has three models. In the one and Two -parameter model, the ability of students is found by measuring the difficulty of the question. Three-parameter model takes an additional parameter which is concerned with the assumption that students with low ability can also give correct answers. We also use a fourth parameter which is time parameter. It is pertinent to note that some students take more time in answering questions while others will answer the same question in faster time. However, the ability of both students using the first, second, third and fourth parameter which is not an accurate representation of the student's true ability.

Online System for Preparation of MCQ based Evaluations

Achievement test is a mechanism to measure student's knowledge and abilities. We have developed a system which allows the students to first prepare for these tests through provision of educational material and then it also lets them do a number of attempts getting their result in percentile. We intend to use Item response theory with an additional parameter of "time taken for the attempt" so that an adaptive reflection on the student's overall outcome be made. We are developing an application to be used for conducting our experiment and formulation of results. We share our students' records to potential employers to improve employability chances of these students. For example, the case of a student who is planning to appear in entry test for medical collages. our system would not only allow him a number of mock exams but it would also allow them to study various study material as well. The students are given a percentile score showing their deficiency and making them study according to their deficiency areas.



KEY RESEARCHERS

Dr. Tamim Ahmed Khan

Tamim Ahmed Khan is currently serving as a Professor in the Department of Software Engineering, Bahria University Islamabad Pakistan. He received his PhD in Software Engineering from Leicester University United Kingdom in 2012. He received MS in Computer Engineering from CASE, Taxila University, Pakistan in 2006. He received MBA in Finance and Accounting from Preston University Islamabad Pakistan in 1997. He received BE Hons. in Software Engineering from Sheffield University United Kingdom in 1995. His research interests include Service Oriented Architectures, E-learning and Software Quality Assurance.

Dr. Uzma Masroor

Dr. Uzma is an Associate Professor at department of Professional Psychology, Bahria University Islamabad Campus and is leading a research cluster of Psychological Interventions and Personality development. She holds a doctorate degree in Clinical Psychology from Institute of Clinical Psychology, University of Karachi and is a practitioner Clinical psychologist and member of American Psychological Association (APA). She has trainings from recognized institutions in psychotherapeutic interventions and provides regular trainings in professional and personal domains as a certified trainer. Her research is mostly in psychological interventions, automation of neuro-psychological tools and identification of psychological disorders and learning disabilities in general.

Dr. Noshi Iram Zaman

Dr. Noshi Iram Zaman is HOD of Professional Psychology, at BU. She embraced a doctorate degree in Clinical Psychology from Institute of clinical Psychology, University of Karachi. She is a trained and certified hypnotherapist from National Guild of Hypnotists-USA, NLP Practitioner from National Federation of Neuro-linguistic Psychology Florida, USA and Eidetic Practitioner from Eidetic Psychology Solutions, Ireland. She has multiple national & international publications and has supervised a number of MS/PhD scholars and is a member of APA. Her research is mostly in psychometrics, psychological intervention, positive psychology, E-learning and automation of achievement test and identification of stunted children. Besides this she has a vast experience in teachers training, seminars, workshops and guest lectures etc. Dr. Zaman is a practitioner clinical psychologist and has intensive experience in dealing with psychiatric issues/disorders. Moreover, she has contributed a lot in promoting awareness regarding psychological health and mental wellbeing via teaching, research, talk shows and television programs.

Dr. Awais Majeed

Dr Awais Majeed is a Senior Associate Professor and is currently heading the Department of Software Engineering. Dr Awais received his PhD degree from Manchester Business School, The University of Manchester UK. He specializes in Software & Information Systems Engineering. He has been active researcher and has published extensively in international conferences and well reputed journals. His recent research interests include Software Architecture and Design, Service Computing, Usability Engineering and IoTs. Dr Awais is also Professional Engineer and member of IEEE.

Dr. Raja Muhammad Suleman

Dr. Raja Muhammad Suleman is a Senior Assistant Professor at the Department of Software Engineering, Bahria University Islamabad Campus. Dr. Raja completed his PhD in Artificial Intelligence in Education from Japan Advanced Institute of Science & Technology in 2016. He was awarded the JAIST President's Outstanding Research Achievement Award for his PhD Thesis. He has been actively participating in multiple Higher Education Commission projects worth over 13 million PKR. His current research interests include; Intelligent Tutoring Systems, Data Mining, Big Data Analytics, Natural Language Processing and Blockchain.

Mr. Hassan Tanvir

Mr Hasan Tanvir is currently serving as Lecturer in Bahira University Islamabad Campus, Pakistan. He received his MS. in Software Engineering from the same institution in 2014. Prior to this appointment, he worked as a senior software developer and game designing and planning. He has done his graduation in Computer Science. His research area includes Image processing in medical field, Signal processing, Impact of gamification on education and E-learning domains.