EDUCATIONAL TECHNOLOGY AND ICT

Dr. Sarita Anand

Department of Education, Vinaya Bhavana

Visva-Bharati, Santiniketan

Week-10

Lecture-50

Module-50: Computer Aided Evaluation (CAE)

Hello dear learners, welcome to SWAYAM-NPTEL course on Educational Technology and ICT. I am your course coordinator, Dr. Sarita Anand, from the Department of Education, Vinaya Bhavana, Visva-Bharati, Santiniketan, West Bengal, India. Today, we will talk about Module 50 on Computer-Aided Evaluation (CAE), and this is Lecture 50. Before going to the lecture, we will go through the concepts covered. Earlier, we discussed CML (Computer-Managed Learning), its concepts, main features, its process, how instructional instructions are managed by computers, types of CML, and the functions of CML-how it operates.

Now, we will go through the concept and meaning of CAE, Computer-Aided Evaluation. So, Computer-Aided Evaluation refers to the use of computers and software to assess, grade, or evaluate academic performance, skills, or knowledge about any concept. It uses technology to automate or semi-automate the evaluation process, making it more efficient, consistent, and scalable. CAE is widely used in education, training, and certification systems to evaluate students, employees, or candidates. The primary goal of CAE is to reduce human effort, minimize errors, and provide objective and timely feedback. This is very important.

When we opt for manual evaluation, it takes time, and the results are delayed. However, with Computer-Aided Evaluation, the most prominent benefit is that it saves time. It can be applied to various types of assessments, including multiple-choice questions, essays, programming assignments, and even complex problem-solving tasks. Evolution of CAE. The early stages of CAE were from the 1960s to the 1980s, when CAE began with the use of computers to grade multiple-choice questions (MCQs) and objective-type tests. Early systems were limited to simple scoring and lacked advanced analytics or feedback

mechanisms. The use of optical mark recognition (OMR) scanners for evaluating multiple-choice questions when we were students, we also faced this kind of CAE using OMR sheetsand from 1990 to 2000.

the advancement of the internet and the also the softwares development led to the creation of online assessment platforms systems like Computer Based Testing (CBT) and the LMS emerged the enabling remote evaluation and automated grading. In this course also you will go for the computer-based testing CBT and the third stage is 2010 till present and this era is the AI era and the machine learning. It is revolutionizing the computer aided evaluation by enabling the evaluation of subjective responses also such as essay and open-ended questions can also be evaluated with the help of computers. Difficulty of questions adjust based on the candidate's performance become possible and now integration with the big data analytics allowed for personalized feedback and performance tracking. Now, we will try to understand that how CAE system typically functions and it is start with the question bank generation, educators create a database for objective and subjective questions, automated test administration, student take the computerized assessment on web-based platform.

like you go for the CBT test, AI and data analytics tools evaluate answers in real time and the scoring and feedback generation. This is also having type of performance task like objective question auto graded using predefined answer keys like you are also giving the weekly test. Subjective question evaluated using AI based essay scoring, answers are already feeded or the models are trained and the feedback reports, AI generates the personalized feedback and recommendations according to the performance of the learners. The plagiarism and cheating detections tools like Turnitin and ProctorU ensures the academic integrity if there is any kind of plagiarism or not. In the basic type of CAE.

We all are studying since long that the there are basic type of CAE or any evaluation that is formative and summative being used during the learning process to provide the continuous feedback, we use the formative formative assessment in between the teaching. And for example, quizzes practice test or interactive exercises in online learning platforms like Khan Academy or Coursera or any other online classes which you are utilizing. And the summative assessment we know that it is conducted at the end of the course or the program to evaluate the overall performance of the candidate or the learner. For example, our final examination, certification test or any standardized test like GRE or TOEFL test.

The third one is diagnostic assessment both first and second are formative and summative are the most basic we all use in our school or college or education system. The diagnostic assessment is the third one it used to identify the strength and weakness before starting a course. This diagnostic assessment is related with the pre checking of the any student or the candidate that how he or she will be performing or he will learn the thing or not. So, for example, placement test in language learning apps like Duolingo they are using this diagnostic test assessment. Adaptive assessment it adjusts the difficulty of questions based on the candidate's response.

For example, adaptive test in platforms like ALEKS or GMAT. These are the most advanced test which are adaptive and according to your responses they change their questions. The fifth one is peer assessment the uses CAE tools to facilitate peer reviews and collaborative evaluation for example, peer grading systems in MOOCs. And if you are providing the peer assessment that will be beneficial not only for the learner for the peer group also because they will learn others assignment also.

The category of CAE, we can categorize the computer added instruction on the basis of assessment type, automation level and evaluation technique. Here I have categorized tried to categorize in a picture form that based on the automatic level semi automated evaluation and fully automated. Based on the assessment type objective or subjective and evaluation technique or technology used the computerized adaptive testing. AI based automated scoring and proctored online examination like we do in our SWAYAM courses CBT So, the first based on the assessment type is objective or subjective like it includes the MCQs true and false fill in the blanks etc.

The OMR based examination like NEET, JEE, UPSC Prelims etc. are using this kind of evaluation system. The subjective based evaluation like evaluates descriptive answers, essays, coding assignments for example, AI driven essays scoring like TOEFL test, GMAT and GRE test. The second type of category is based on the automation level. The First one is semi automated evaluation, teachers review AI generated scores and provide manual feedback for for example, Google classroom assignment grading.

However, you are using AI or not, but the teacher can check it. Me as a teacher I am able to trace it out that this content is AI generated or not. So, the other teacher also can do that and human intervention is required for the semi automated evaluation. The fully automated evaluation AISS responses assigns grade and provides feedback without human intervention and like the Pearson PTE this grading the in India we normally avoid or our

education system not allow us to go for the fully automated evaluation that is why we use the semi automated evaluation where we go for the human intervention.

Now, the third one is the technology used or technology utilized CAE, where computerized adaptive testing CAT is used AI adjusted questions difficulty based on the student's performance and any kind of computerized exam like GRE and GMAT also. AI based automated scoring uses natural language processing NLP. This AI based automated scoring to evaluate the essay for example, ETS, e-rater and TOEFL examination. Proctored online examination uses AI based webcams and face recognition to prevent the cheating ah. For example, TCS AI on remote proctored examination are being conducted with the help of proctored online examination system.

Now, we can take the examples of CAE computer added evaluation in the present day of education system in India. For example, at national level NTA is organizing CBT and in very big examinations like JEE, NEET and CUET using OMR and AI. And institutional level examination like IIT Bombay is using MOOC grading system with the help of AI generated or automated grading systems. State government initiative like state of Maharashtra and Karnataka and Kerala also using the AI based examinations via DIKSHA or SARAL platform. I will suggest that you also should go through the SARAL platform.

This is also the government of India initiative. And the third type is international CAE tools; computer aided tools used in Indian education like Turnitin we are using for plagiarism detection. So, many IITs, NIITs and central universities are using this and the Moodle LMS or auto evaluation is being utilized by the institutions like NIEPA, IGNOU, DU, Amity University, TATA, TIS is using this Moodle CAE. We can say that the CAE is being utilized by the ah Indian universities also. So, comparison now I had prepared one table for the comparison of computer aided evaluation and traditional assessment method.

For for better understanding you can go through this table and We try to understand that what is the CAE and how it is different from the traditional assessment method like on the basis of different parameters like definition, mode of assessment, speed of evaluation, objectives, objectivity and biasness, scalability, flexibility, question type, security and integrity, feedback mechanism, cost effectiveness, eco friendliness, suitability and examples. So, I hope this table will be beneficial for you to understand and please go through it this is lengthy. So, I am skipping the comparing the table.

So, important points of the comparison I can go through the gist of the table that CAE is faster scalable and objective while the traditional assessment is time consuming and

subjective. CAE enables the automated grading and real time feedback whereas, traditional methods require manual review and the feedback is delayed many times teachers are not able to give each and every student the feedback.

The AI driven a CAE ensures the security and reduces malpractices unlike traditional handwritten examination. Traditional assessment is still essential for the practical, descriptive and skill-based evaluation. Though there are so many benefits of CAE I can count, but remember that the traditional assessment is still essential for practical, descriptive and skill-based evaluation because our education system is like that only online testing or online provisions cannot fulfill all requirements of a course or the degree.

So, we can say that the hybrid model where CAE automates the objective evaluation and the teachers manually assess the subjective and skill-based task, this ensures the efficiency, fairness and holistic assessment. So, we cannot deny at any stage we cannot deny the role of the teacher either the content Creation, Dissemination or the Evaluation. So, we can count the advantages, we have already discussed that efficiency, consistency, scalability, personalization and data driven insights and the challenges. I have mentioned that all the technical challenges are every time coming with the computer related concepts.

Here also the technical limitations are there, over reliance on the technology is not good, Suppose, if the electricity has gone everything will be stopped, but in human intervention or the manual testing this that problem will not come. The privacy concerns the handling sensitive data of the students or the teacher is the major issue and the cost. The cost is also very important issue in the case of computer added evaluation because system can be expensive and people are not able to adjust or purchase the computer added softwares or the technology enhanced systems for their institution.

So, in conclusion, we can say that CAE has improved the assessment process with advancements in AI and CML. The future education system will rely heavily on automated, intelligent, and adaptive evaluation models by using the technology. CAE automates tasks such as test generation, grading, and feedback, reducing the burden on educators. There is no doubt that it ensures timely and precise assessment while also providing feedback to the students. Its ability to provide immediate feedback supports adaptive learning, allowing students to identify and address their weaknesses promptly. Moreover, CAE facilitates large-scale assessment, ensuring uniformity and fairness in evaluation. However, challenges such as technical limitations, potential bias in automated grading, and the need for adequate infrastructure must be addressed for its effective implementation.

Time and again, I am saying there is a need for adequate infrastructure in any case of technical gadgets, devices, or digital education. Now, the references I have given are for your further studies. I hope you will go through them.

Thank you. Keep learning.