



Role of Technology in Changing the Teaching and Learning Agricultural Statistics in Sau's

KEYWORDS

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The developments in computer technology, advances in using data base management systems (DBMS) and new data analysis procedures provided by current data mining (DM) have substantially changed the situation in the field of data processing (DP) and information technologies in SAUs. Using technology can make teaching more effective. It improves the quality of resident instructions, motivates the learning process and encourages students. Technology can achieve three important goals (Lock1999):-

1. Encourage students to think like experts, getting them to understand the problem solving processes and critique solutions to problems.
2. See the way students think, so it focuses on the process of learning not just the results and
3. Build up knowledge on what students already know.

Technology can have a profound impact on teaching and learning Agricultural Statistics in state Agricultural Universities. "What makes a good teacher and what makes good technology"? A good teacher knows how to not just "Use" technology but to make it an effective part of teaching and learning. There is a need for the Professional development of teachers in order for them to effectively teach statistics and use technology to teach statistics.

- It is suggested that the dynamics of the software allowed students to build continuity from their understanding of properties of single cases to the more abstract statistical features that emerge when multiple cases are arranged in statistical displays.
- Computers gave students opportunities to look at an entire process and confront misconceptions right from the start.

Vital steps needed for effective teaching and learning in Agri. Statistics

- i. Create a national centre for sharing ideas, research findings, materials and resources: - There is a need to synthesize and disseminate the results of implementation and research to prevent reinventing the wheel. There is currently no formal mechanism for sharing the results of research on effective ways to teach a concept or on the ways students comes to understand a statistical idea. Even sharing professional development models can be beneficial to those in the field.
- ii. Develop different models of professional development in particular ones to help address issues of scaling:-There are large numbers of existing teachers with little statistical background on which to build, yet most current professional development strategies involve small cadres of teachers. There is need to find efficient and effective ways to reach teachers and to provide continuing support for them as they both learn statistics and how to use technology to teach statistics.

- iii. Create networks among scientists in SAU's:- Bringing together those with different perspective about teaching Agricultural statistics will enable discussions to take place about content and pedagogy. It will also encourage teachers to become researchers and to reflect with others about what works and does not and why.
- iv. Design activities to measure where students are in their Statistical understanding- at UG, PG and PhD.

Today we depend on computers and on technology to perform our data analysis with computers, statistical analysis are used for decision making using software packages. With software packages there are no worries about programming tasks and scientists of various disciplines today focus on which statistical procedure is appropriate and on how to interpret results. When we use computers and technology in teaching statistics, we need to focus on two points (Morse, 1993).

- Computers perform numerical computations without any regard to the accuracy of data.
- Computers follow the instructions whether or not the procedure is legitimate and fit the nature of data. The user, not the computer is responsible for requesting the proper statistical procedure.
- It improves the quality of instructions, motivates the learning process, encourages students active learning in the form of participations and feedback at their own pace, in the course, and provides students with incentives they need to work hard. (Garfield, 1995).

Potential of technology:

Technology provides the opportunity to create an entirely new learning environment, in which computers can be used as tools in problem solving and to faster conceptual development. Thus, students can take a more active role in learning by asking their own questions and exploring various alternatives to solving them. The use of computers allows students to pursue investigations, faster's cooperation with fellow students. Thus, computers have made the creation of graphs and tables acceptable problem solving tools, in addition to the more traditional numerical and algebraic methods. Real situations produce large data bases, which are hard to handle without a computer and which offer many opportunities for investigation using a variety of methods.

The use of computer-based technology to provide learning experiences to help build understanding of the concepts and ideas that underlie statistical theory has long been promoted by statistics educators as a means of enhancing the teaching and learning of statistics.

In Salamon et-al's (1991) terms, this is an effect of the technology. When technology is used in this way in the teaching and learning of statistics, its prime purpose is to provide a

learning experience that will develop statistical understandings and insights rather than just generate statistical results, although these may be a by product of the activity. During the past few decades, technological resources have become widely available for use in the teaching of statistics. Technological resources, such as electronic mail, internet and www play a significant role not only in class room environment but in everyday life.

Educational potential of computer-based technology:

The software will almost certainly increase the student's capacity to analyse by automating the process. It might be found that as a result of using the software in carrying out this and other analysis in general. This would be termed an effect of the technology.

- 1) Training of newly recruited teachers and existing teachers is essential so that full use of these technologies can be successfully implemented in the class room.
- 2) Computational statistics workshops such as those organized by IASRI- New Delhi should be greatly encouraged.
- 3) Provide supportive environment that is rich in resources, aids explosion, and creates an atmosphere in which ideas can be expressed freely.
- 4) Physical activities need to be integrated with computer simulations to establish that the knowledge gain from simulations is applicable to real world phenomena.

Future of Internet:

- Increased use of the internet to share teaching and research materials including traditional and new forms of interactive textbooks.
- Increased "bandwidth" that makes video materials and full multi-media documents accessible.
- Increased development of computer programs and statistical packages that are run by the internet browsers.
- Improved methods paying for materials used on the internet with resulting commercialization of the internet.
- Increased interest in developing text material and computer programs that are in the public domain to allow users to freely use them and to contribute to making them better.
- The development of statistical software for inclusion into statistical lessons should be monitored and evaluated.
- Computer networks for dissemination of data and information should also be produced.
- National magazine for dissemination should also be produced.
- Gmail communication between students and instructors.
- Posting daily handouts on internet site.
- Posting class data on internet site.
- Finding articles from the popular media.
- Finding additional information on articles.
- Gathering of information and data for student projects and thesis works.
- Interactive modules and texts that illustrate basic concepts of statistics and can be run from the internet.
- Electronic journals should be introduced.
- Video conferencing should be introduced [Moore et al (1995)] has presented the strengths in this method and its future potential.

Concluding Suggestions:

- A change of emphasis when designing courses and software from teaching the standard concepts and techniques of statistics to enabling students reason statistically with confidence and without error.
- The emphasis shifts from methods of teaching "stu-

dents" to design the suitable packages for "users" who will still need education in the background concepts.

- The framework of statistical concepts and techniques behind what students learn and the software they use should be treated as a variable and designed to make the cognitive system as user-friendly and powerful as possible.
- Understand students how statistical methods are created, developed, learned, communicated and taught most effectively at different levels.
- Learning with the above concepts using technology brings about lasting changes in the students cognitive capabilities.
- More long term research projects need to be developed on how to best teach particular topics in the presence of technology.
- Finding needs to become available for these research projects.
- For uses of technology that seem to work well, it needs to be determined why they work well.
- Research should be conducted on how to develop intelligent partnerships between the user and technology. These partnerships are in the context of statistics teaching and learning and in the context of data analysis in the work place.
- More research should be conducted to investigate how the use of various forms of technology can increase student's intuition, knowledge, understanding and higher order thinking skills for statistics topics.
- Research should be conducted to determine if, when real data are used, students prefer one large datasets as the bases for a course or several different data sets.
- IASRI-New Delhi should play a prominent role in helping SAU's to gain greater access to technology.
- Teaching of new data analysis procedures in SAU's and affiliated colleges must be expanded.
- Text books with examples for Agricultural statistics on new data analysis procedure must be published.
- Workshops on the new procedures must be organized.
- Tutorials on the new data analysis procedures (with example from agriculture) for agricultural statisticians must be made acceptable via internet.
- Agricultural statisticians and allied computer specialists should work for recasting statistical data analysis procedures.
- Implementation of data mining methods in agricultural research and investigations must be extended.
- Specialized classes for the professional statisticians, such as experimental design, ANOVAs, sample survey design, regression, time series, multivariate analysis, forecasting techniques, artificial, neural networks and genetic algorithm should take a teaching approach that will construct concepts and builds well the learning process.
- Faculty in Agri. Statistics and Computer applications should have full access to the facilities needed for development of their discipline in SAUs to ensure changes in the light of technology developments.
- Curricula and syllabus recasting should include the faculty involved in teaching/research of Agri. Statistics and Computer applications.
- There should be uniformity of the syllabi in Agri. Statistics/Computer applications an all the UG/PG degree programmes of SAUs and the use of software's S-plus, R, SAS should be encouraged.
- The restructured syllabus proposed by ICAR for PG programmes in Agri. Statistics need to be implemented simultaneously by all SAUs as it lays much stress in teaching technology utilization in Agri. Statistics.

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