Discussion of IPM 52: Using History to Enhance the Teaching of Statistics

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David Dennis' paper about "The Role of Historical Studies in Mathematics and Science Education Research"(2000) has offered to me a useful framework from which I have developed the scheme below to put in evidence: objectives, perspective and lines of action of historical studies in statistics education research.

Framework of objectives, perspective and lines of action of historical studies in statistics education research

Objective	Perspective	Line of action
Curriculum design	Historical background as an addendum to traditional curriculum to get an idea of the place of statistics and probability in culture	To provide students with a cultural context
Creation of environments for teaching	Deep understanding of the genesis of statistics and probability concepts	To provide researchers in education with ideas for designing learning environments
Elaboration of cognition theory	Study of the socio-cultural genesis of knowledge so to give value to concepts, linking the past to the present and taking into account newly emerging educational goals in larger society	To allow researchers to critique existing curriculum

Within this framework, Irena Ograjenšĕk's paper titled "Taking the fear out of data analysis: case for history lessons in statistics courses" appears to be particularly concerned with "giving the students a cultural context for statistics" within the existing curriculum. This is done in the view of "constantly improving ways of gaining and retaining students' interest in statistics". Ograjenšĕk's proposed strategy is to add history lessons in statistics courses where appropriate, thus creating a lively learning environment where students come in touch with a more human discipline, learning from the past – statistical blunders included. This strategy, obviously, requires that teachers have access to good historical materials, that are conceptually reach. Ograjenšĕk offers us a set of very useful historical materials both in paper and on-line. Her positive message is that no matter the very demanding "technical" requirements to prepare good history lessons, what is important is students' interest that results in a growing appreciation of the discipline and its application.

Also the paper presented by David R Belhouse: "Probability and statistics ideas in classroom – Lessons from history" seems to fit well in the proposed framework. In particular Belhouse's distinction among internalist and externalist historians appears to ascribe internalist historians to the first two perspectives: focusing on the place of statistics and probability in culture and deeply understanding of the genesis of statistics and probability concepts. Externalist historians follow the third one: the study of the socio-cultural genesis of knowledge so to give value to statistical and probabilistic concepts. In fact while internalists tend to move in the direction of the questions: how

and why new knowledge in probability and statistic was created and by whom, the externalist emphasise the socio-cultural background giving rise to certain probabilistic and statistical development. Belhouse began his experience providing his classroom with a cultural context for statistics following three ways: historical problems, historical personages and historical data. The results were not so exciting as Belhouse says: "most students today are not interested in history and think that the discipline is not relevant to their future careers". Consequently he decided to learn from his experience, finding better ways to utilise history in the classroom and his reply has been to motivate students, that is "to discover and describe what motivated people to work in various problems". In fact, quite always, in the history of statistics new concepts were encountered in operative stages, for instance in problem solving activities. To re-discover this may allow to attain students' motivation and interest on the deep problems that had to be solved, and on the way in which practical problems, intellectual exercise and curiosity combined altogether so to develop new concepts and new interesting solutions. This make concepts itself more evident and relevant, particularly if it is possible to link the past to the present, as it is the case for a keystone in statistics: the logic foundation of statistical inference.

Within the proposed framework David Vere-Jones' paper: "Teaching probability via its history: reflections on a case study", about his experience of teaching a third year probability course onto historical bases concerns, for me, all the three points: context, concept, critique. In his early experience, Vere-Jones, as a researcher more than as an educator, was keen to try out a new approach to probability giving historical content to his course following up the genesis of probability concepts and laws. From the point of view of the students, he found however that historical context and content are not so easy. On the contrary he says that: "Developing the weekly assignment sheets required more thought and research than the students were able to give it". After 20 years, reflecting upon his experience, he comes to what is for me the core of the problem: the current curricula give little value to statistical logic and method, but on the contrary it tends to see statistics as a set of techniques immediately useful for something. In this situation, cultural an historical aspects have no value.

Unfortunately, to be honest, in my view, also statistics is in difficulty as people find it hard to give value to our discipline. May be statisticians have to follow what Dennis (2000) calls"the Vygotskian perspective where science and mathematics are considered to be linguistic tools, and tools are seen as socially mediated agents that transform human endeavours in which society and the state have an interest." (Dennis 2000, p. 808, citing Confrey).

As a statisticians I would like to put in evidence that statistics is really a tool, the tool to deal with collective phenomena and the information coming from the observation of each unit forming the collective phenomena. Statistics was born to study socio-economic collective phenomena, that no other instruments was able to measure. It was born for national Government needs. To day, in the large society each citizen needs statistics, but he/she experiences statistical intrusion as a citizen and a "non appealing" discipline if he/she has the chance to be exposed to statistics as a student.

So, in my view it could be worthwhile to better explore Vygotskian perspective, trying to read in the history the reasons why the larger society and State need statistics.

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