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**Towards Pedagogy supporting Ethics in Analysis**

Over the past few years we have seen an increasing number of legal proceedings related to inappropriately implemented technology. At the same time career paths have diverged from the foundation of statistics out to Data Scientist, Machine Learning and AI. All of these new branches being fundamentally branches of statistics and mathematics. This has meant that formal training has struggled to keep up with what is required in the plethora of new roles. Mathematics as a taught subject is still based in decades old teaching specifications and has not been updated centrally as a curriculum to include new technologies, coding or ethics. This subject area is firmly split between ICT and Mathematics in secondary school, continuing on to be split between Computer Science and Mathematics at University. As we move forwards with technology we see these once seperate fields becoming increasingly intertwined.

We propose that existing provision for concepts such as ethics and societal responsibility in analysis currently exist but have not been incorporated into the mainstream curriculum of School or University. This is partially due to the split between fields in an educational setting but also the speed with which education is able to keep up with Industry and its requirements. Principles and frameworks of socially responsible modelling beginning at school level means that ethics and real-life modelling are introduced much earlier than normal. Integrating these concepts with philosophical principles of society and politics ensures a suitable background for future modellers and users of technology to draw on.

Modelling is currently undertaken in technical sciences at University but the Subject Benchmark Statements are not current (Subject Benchmark Statements describe the nature of study and the academic standards expected of graduates in specific subject areas. They show what graduates might reasonably be expected to know, do and understand at the end of their studies). Even in 2019 the UK did not yet have Benchmark Statements that discuss the learning to be done in Higher Education around AI and advanced Machine Learning. Where there is provision for AI and Data Science within degree courses ethics is not generally highlighted as a key concept. As such there can be a lack of focus on the teaching of modelling or ethics as specific skills. The skills required to use a basic statistical model, for example would not be sufficient to start from scratch and build an ethical model reflecting real-world scenarios with which to inform policy or organisational decision making. This is a skill in itself and includes such aspects as awareness of data quality, ethics, user implementation problems, context and an understanding of the environment that the model is being created in. As the field of analytics has progressed so quickly in the last decade modules such as those covering AI have simply been bolted on to Maths or Computing degrees rather than being fully detailed as key areas of study or driving new, more integrated courses of study.

This paper posits that gaps at primary, secondary and tertiary educational levels need to be addressed. Implementing and integrating key concepts from school level is essential so that areas such as assumptions, caveats, quality assurance and answering the right questions with constructive challenge become a cultural fixture. This not only helps developers of technology but users of rapidly developing technology also. In addition, leadership and soft skills as part of this education will ensure that a cultural shift can take place and promote continuous improvement in analysis within organisations.

The addition of key concepts throughout the educational system and the updating of potentially outdated curriculums is key to ensuring a functional society. A society where every citizen is a user of tech and those that develop it can be ethical and socially responsible in its development.

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