Evaluating the 'Assembled Educator' of a Specialized Postgraduate Engineering Course Using Activity Theory and Genre Ecologies

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Abstract : The landscape of professional postgraduate education is changing: the focus of these programmes is moving from preparing candidates for a life in academia towards a focus of training in expert knowledge and skills to support industry. This is especially pronounced in engineering disciplines where increasingly more complex products are drawing on a depth of knowledge from multiple fields. This connects strongly with the broader notion of Industry 4.0 – where technology and society are being brought together to achieve more powerful and desirable products, but products whose inner workings also are more complex than before. The changes in what we do, and how we do it, has a profound impact on what industry would like universities to provide. One such change is the increased demand for taught doctoral and Masters programmes. These programmes aim to provide skills and training for professionals, to expand their knowledge of state-of-the-art tools and technologies. This paper investigates one such course, namely a Software Defined Radio (SDR) Master's degree course. The teaching support for this course had to be drawn from an existing pool of academics, none of who were specialists in this field. The paper focuses on the kind of educator, a 'hybrid academic', assembled from available academic staff and bolstered by research. The conceptual framework for this paper combines Activity Theory and Genre Ecology. Activity Theory is used to reason about learning and interactions during the course, and Genre Ecology is used to model building and sharing of technical knowledge related to using tools and artifacts. Data were obtained from meetings with students and lecturers, logs, project reports, and course evaluations. The findings show how the course, which was initially academically-oriented, metamorphosed into a tool-dominant peer-learning structure, largely supported by the sharing of technical tool-based knowledge. While the academic staff could address gaps in the participants' fundamental knowledge of radio systems, the participants brought with them extensive specialized knowledge and tool experience which they shared with the class. This created a complicated dynamic in the class, which centered largely on engagements with technology artifacts, such as simulators, from which knowledge was built. The course was characterized by a richness of 'epistemic objects', which is to say objects that had knowledge-generating qualities. A significant portion of the course curriculum had to be adapted, and the learning methods changed to accommodate the dynamic interactions that occurred during classes. This paper explains the SDR Masters course in terms of conflicts and innovations in its activity system, as well as the continually hybridizing genre ecology to show how the structuring and resource-dependence of the course transformed from its initial 'traditional' academic structure to a more entangled arrangement over time. It is hoped that insights from this paper would benefit other educators involved in the design and teaching of similar types of specialized professional postgraduate taught programmes.

Keywords : professional postgraduate education, taught masters, engineering education, software defined radio