Moving from teaching mathematics to exploring mathematics: A Spreadsheet approach

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Traditional teaching of mathematics appears to be adopting a more didactic, behaviourist approach. Mathematics teachers seem to focus more on the procedural domain, but not the conceptual domain. Little effort has been made to fill the gap between the two. Furthermore, mathematics problems in the contemporary curriculum are normally rigidly structured and "manipulated" to meet assessment requirements. This widens the gap between abstract mathematics and the real world. The traditional mode of learning, which is expository and teacher-centred, does not encourage active learning, and it may not be effective in producing independent, analytical learners. In this paper, the learning of mathematics is viewed from a different paradigm. The author provides an alternative learning model, employing the Spreadsheet as a learning tool. The instructional approach witnesses a shift from the notion of "teaching mathematics" to that of "exploring mathematics". The new mode emphasizes learning by exploring, conjecturing, testing and discovering. The author demonstrates that with appropriately revised problems and suitably designed task questions using the inquiry approach, it is possible to elevate the thinking order of the learner from low to high. The epistemological advantages in the use of the Spreadsheet to carry out mathematical investigations are also highlighted. To support the proposed learning model, a comparison between the traditional model and the suggested model is made by using the optimization problem as an illustration.

Keywords: knowledge construction; inquiry-based learning model; higher order thinking skills