Introduction

Rather than having students respond to a set of questions provided by teachers for evaluation purposes, allowing students to reflect and generate questions on course content grants them an opportunity and responsibility to self-assess their levels of understanding and comprehension (Birenbaum & Dochy, 1996; Silver, 1994). Student question-generation activities engage individual learners in actively constructing their internal knowledge representations and structures, and enable them to elaborate and transform received information into personally meaningful forms (Barr & Tagg, 1995; Palincsar, 1998; Yu & Liu, 2008; Yu, Liu, & Chan, 2005).

In essence, the activities carried out in student question-generation put constructing personally relevant and important knowledge at their core (English, 1997), and the learning benefits of student question-generation have been well-documented. These include supporting the development of a deeper understanding of the subject content learned, and the development of higher order thinking skills, such as creative thinking, critical thinking and problem-solving. Overall, the accumulated evidence from many studies since the 1960s provides a solid empirical basis to support the teaching and inclusion of student question-generation in order to enhance student comprehension, academic achievement, motivation, question-generation abilities, cognitive and metacognitive strategies use, problem-solving abilities and attitudes toward the subject matter being studied (Abramovich & Cho, 2006; Barlow & Cates, 2006; Belanich, Wisher, & Orvis, 2004; Brown & Walter, 2005; Dori & Herscovitz, 1999; English, 1997; Keil, 1964; Koch & Eckstein, 1991; Perez, 1985; Rosenshine, Meister, & Chapman, 1996; Silver, 1994; Whitin, 2004; Yu & Liu, 2005, 2008).

Although the theoretical foundations of student question-generation are sound and the empirical evidence supporting its positive effects is solid, issues with regard to the nature of the enacted learning processes and their relationships with psycho-logic variables of importance (e.g., perceived task value) remain largely unexamined empirically. Affective components can have a decisive impact on learning (Krashen, 1987), by moderating learners' emotional states and goal orientation toward the activity they are engaged in (Eccles, 1994; Pintrich & De Groot, 1990). In fact, an individual's motivational beliefs and emotional feelings toward an assigned task influence his or her goal-setting, the interpretation of the related cognitive demands, and the choice of strategies to be used (Eccles & Wigfield, 2002). Value and expectancy for success are two important components constituting motivational beliefs. Specially, how a person perceives the value of the given task may influence his or her goal orientation. Those who perceive greater positive task value or have a higher

expectancy of success tend to set higher and more intrinsic goals, make good use of the available resources, and perform better in the task itself (Eccles, 1994; Ling-Yee, 2011; Pintrich, 1989; Pintrich & De Groot, 1990). Additionally, the perceived value of a task is positively associated with the related expectancy for success (Lawanto, Santoso, & Liu, 2012). Studies show that perceived value plays as a key role in the learning process. Therefore, it can be reasonably inferred that the perceived value of the strategy introduced in this work, student question-generation, will influence the students' adoption of the learning approaches and strategies. Since there is currently a lack of understanding and validation of this inference in the context of question-posing activities, an exploration of the "process" aspect of student question-generation and role of perceived value are issues that deserve more attention, and thus are the main focus of this study.

In the following sections, the state of current research on student question-generation is briefly reviewed. The nature of the learning processes involved is then presented with reference to two theories—information processing theory and student approaches to learning. The limitations of current research on student question-generation are then highlighted, and this is followed by the purposes, research design and results of this study.

State of Current Research on Student Question-Generation

Student question-generation has been suggested as an important cognitive strategy that fosters self-regulation and comprehension (Rosenshine et al., 1996). A literature search on student question-generation up to the year 2011 was conducted to better understand the current research state. Using "problem posing," "question posing," "student question-generation," "student-generated questions" and their variants to search the "National Digital Library of Theses and Dissertations in Taiwan," "Index to Taiwan Periodical Literature System" and "Educational Documents Online" for studies published in Taiwan, and ERIC and EBSCO for those published in the US, a total of 109 empirical studies from the Chinese and English online databases, 65 and 44, respectively was obtained, after deleting redundant works and excluding non-empirical ones.

An analysis of these studies revealed that most (75%) involved open-ended question-generation in math. The results also showed that starting from the year 2001, an increasing number of studies were conducted in a wide variety of disciplines, including social studies, foreign language learning, business, law, information technology, physics, ecology, science, business management, teaching professional development, and so on. Moreover, since different types of questions have their own distinct strengths and weaknesses, recent research has examined the generation of various question types, such as free response, multiple-choice, matching, yes/no, fill-in-the-blank and so forth. Fourth,