

Exploring Approaches to Assessing Student Teamwork in Undergraduate Computing Projects

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ABSTRACT

Teamwork is increasingly prominent in computing education. At the tertiary level, educators use group projects to nurture professional skills and employability. However, there is considerable variance in how such collaborative work is assessed. Emphases can be placed on the process, output, or upon reflection—and even individual or collective performance. This often evokes student concerns and drives considerable discourse on grading student teams. Yet, the diversity of approaches in computing and how their varying aspects influence their reception is not well understood. Concerns about the parity and inclusivity of some methods, such as peer evaluation, permeate the literature. However, there are also intriguing opportunities which computing departments are well-placed to implement, such as versioning, tracking, and analytics. This working group will survey approaches to assessing student teamwork in undergraduate computing projects. The aim is to examine global perspectives using a multi-national, multi-institutional framework whilst considering some contextual dimensions. This intends to yield some contemporary assessment models, an evidence-informed comparison of their merits and drawbacks, and recommendations for assessment practice.

*Co-leaders

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CCS CONCEPTS

• **Software and its engineering** → Programming teams; • **Applied computing** → Collaborative learning; • **Social and professional topics** → Computing education programs; Model curricula; Student assessment.

KEYWORDS

student, team, group, collaboration, assessment, marking, grading

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1 INTRODUCTION

Group projects in computing are pivotal for preparing students for the demands of the modern workforce. With collaboration being a cornerstone of success in various industries, computing graduates must possess technical proficiency and the ability to work within teams effectively. Employers place a premium on interpersonal and communication skills that students develop through such experiences [4].

The literature on collaborative group work illustrates that students find these learning experiences valuable but that there is considerable room for improvement [9]. There is a broad spectrum of approaches to student teamwork [7, 17]. Despite educators' efforts to emulate industry practices, student satisfaction with group

projects remains inconsistent, with some methods failing to garner universal acclaim among students [2].

A key aspect of the ongoing discourse is assessment strategy [12]. A significant body of research highlights the complexities and nuances of evaluating such projects effectively [8], with a recent systematic review calling for a reflection and revalidation of blended approaches [16]. Traditional assessment methods often struggle to capture the multifaceted nature of teamwork, leading to questions about fairness, validity, and reliability [3]. Although peer evaluation is often suggested, the link to grades is often questioned by students [10, 11] and steps must be taken to ensure parity [2]. Evidence suggests that students' perception of effort is not objective [5]. Intervention is therefore needed to improve assessment processes [13, 14]. The question, however, is *how*. It is challenging to envision an assessment strategy which can accurately measure contributions to teamwork in any given context whilst simultaneously nurturing a supportive, transparent, and equitable learning environment [15].

To this end, prior work is limited in several ways. Many studies are small in scale and limited to a local institutional context. They rarely consider potential contextual factors that may influence the most appropriate choice. There is also evidence that students' preferences can change [15]. Proposing a multi-national, multi-institutional approach, this working group aims to explore the assessment strategies utilized in undergraduate computing projects. It will elucidate educators' various approaches and analyse them across different contexts.

2 AIMS & OBJECTIVES

This research aims to develop and review contemporary, evidence-informed assessment models [6] used in student teamwork within undergraduate computing projects. By examining the merits and drawbacks of different approaches from a global perspective, the study seeks to provide recommendations for best assessment practices. To this end, the following research questions are posed: (i) What assessment strategies are used in undergraduate computing group projects? (ii) Which facets of student team assessment strategy influence its reception by undergraduate computing cohorts? (iii) How might contextual differences across institutions influence dispositions towards assessment strategies for teamwork in undergraduate computing? The corresponding objectives include: (i) identifying approaches to assessing student teamwork in undergraduate computing; (ii) synthesising, elaborating, and formalising the assessment models; (iii) developing an instrument to measure dispositions; (iv) gathering data dispositions towards different assessment models; (v) comparing the assessment models; and (vi) making recommendations to educators.

3 METHODOLOGY

This working group will employ an empirical methodology based on mixed methods. The contextual review will identify several assessment models from the literature, enriched by qualitative data from educators using appropriate primary research methods [1]. These insights will inform ways of gathering quantitative data relating to the dispositions of those involved in group projects. This will facilitate comparison and contrast of the models, forming the basis

for recommendations. The work will adhere to the recommendations outlined by BERA [18]. Whilst the sampling strategy will aim for institutional representativeness, national representativeness or comparison is unlikely.

4 ANTICIPATED CONTRIBUTION

The project aims to describe the assessment strategies utilized in undergraduate group projects within the computing discipline. This account will accompany critical commentary and insights from different global contexts, providing valuable guidance for educators to refine and enhance their teaching practices.

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