

The High-Low Divide: How Teamwork Learning in Undergraduate Computer Science Is Shaped By Cultural Context

1. Introduction

The globalized environment of work in computer science requires a multicultural approach from graduates [1,3]. Hall's context theory provides a categorization of cultures in relation to their approaches to communication and relations: low-context cultures are more direct and value direct communication while high-context culture rely on shared norms and nonverbal cues for communication. While it is known how students from different contexts act [2], it hasn't been investigated if the teaching of teamwork is affected by cultural context.

2. Research Questions

RQ: How does the teaching of teamwork in undergraduate computer science curricula vary across different cultural context learning environments?

Sub-RQ 1: Which methods are used to fulfill teamwork learning goals in high-context and low-context environments?

Sub-RQ 2: How does cultural context affect which learning goals are matched to learning strategies in undergraduate curricula?

3. Methodology

- Inductive coding was performed on course syllabi selected from KAIST and Delft University of Technology (TU Delft)
- These universities were chosen for their majority in student body belonging to high and low contexts respectively.
- The courses chosen had a teamwork assignment as a mandatory part for passing the course, which resulted in 14 courses from TU Delft and 8 from KAIST being chosen.

4. Results

Across both institutions, 17 courses omit explicit learning goals. Both curricula prioritize technical skills over collaborative practice.

Teaching methods

- 5 of 14 courses at TU Delft enforce rigid periodic meeting with a supervisor or teaching assistant while none at KAIST do
- 7 of 14 courses explicitly track individual contributions for grading, with 3 from KAIST relying on student self-reporting for tracking contributions.
- 5 of 14 courses mandate high-context methods as a formalized requirement
- Only 2 KAIST courses have low-context specific methods, implemented in a more indirect way, and none have high-context codes

Learning goals

- 11 of the 14 courses at TU Delft have missing teamwork learning goals, being concentrated in capstone courses
- 6 of 8 KAIST courses also lack teamwork learning goals, with the goals being more holistic in nature
- The TU Delft deliverables focus on individual contributions
- 5 of 8 KAIST courses utilize separate group activities as assessments

Structure and Language

- TU Delft syllabi utilize standardized structure and formal language
- At KAIST professors have autonomy over the structure and information displayed, with a more informal tone present

5. Conclusion

Both universities shared a common technical baseline, but a contextual divide appears in their approach to teaching.

Sub-RQ1: TU Delft uses more strict and individualistically oriented methods to standardize teamwork. KAIST relies on student autonomy and group cohesion to build collective responsibility.

Sub-RQ2: Instead of having teamwork as an explicit goal, both institutions treat it as a tool for creating a product. Identical tools can be affected by cultural values, this difference further being seen in the deliverables of the courses.

The findings show that a mix of low and high-context practices need to be implemented in the curricula, treating teamwork as a multicultural learning objective, so that students are prepared when faced by practices from the opposite context.

6. Limitations and Future Work

- Only investigated public, written syllabi. Semi-structured interviews and classroom observation would give a more complete view.
- Focus placed on 2 representatives from one country each. Expanding the research to other institutions and countries can give more generalizable findings
- Only TU Delft has capstone courses, so choosing universities with more comparable classes will yield more accurate results
- Investigating the cultural aspect of evaluation metrics and their impact on student readiness for a more holistic view of the curriculum

References

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