Cohort Fairness in Examination Timetabling Problems

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Abstract: We will report on progress regarding fairness between students in
the context of the examination timetabling problem. Our data from a student survey regarding their examination timetable suggests that they do care
about fairness, especially fairness amongst students in their cohort. Continuing
from our previous work [1,2], we extend the well-studied benchmark examination timetabling problem formulations (Toronto, ITC 2007 and Yeditepe) to
also account for fairness, and giving models with three objectives; the original
standard objective function, aggregate (global) student fairness, and average
fairness within cohorts. To solve the resulting instances, we have implemented
a hyper-heuristic approach combining self-adaptive learning mechanism as a
low-level heuristic selection strategy and great deluge algorithm as a move acceptance strategy – hybridising the hyper-heuristic with weighted Tchebycheff
approach and also with NSGA-II algorithm, all within an extension of the
Hyflex framework. Experimental results will show that incorporating the classical 'weighted Tchebycheff' method within a multi-objective hyper-heuristic
framework is effective, and outperforms NSGA-II. We also observe that the
potential for fairness improvements is much more significant for the cohort
measures than for the aggregate fairness.

Keywords Fairness · Examination timetabling problem · hyper-heuristic

References

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