# Learners' frequent pattern discovering in a dynamic collaborative learning environment designed based on game theory

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## Abstract

**Goals:** In any educational system, the optimal output of educational approach is of particular importance. Therefore, considering the personality characters of individuals and providing educational services in accordance with their characteristics is an effective factor in learning enhancement. Analyzing the data related to learner's behavior in an educational environment and implicitly discovering the learner's personality is a well-noticed study in recent years.
This study is aimed at using teammates' changing / not changing datas, from a game theoretical based collaborative learning environment and identifying the learners' personality as well as predicting learners' changing/not changing behavior.
**Method:** In this paper, we collect information of 119 randomly selected computer engineering students and identify some aspects of the neo big 5 personality traits of learners using frequent pattern mining. In the next step, using the Laplace's rule of succession, valuable predictions are made about the probability of teammate's changing of learners during the learning process.
**Findings:** Using data mining in learners' behaviour, we identified some neo big 5 personality traits such as those in the first (neuroticism), second (extraversion), and third (openness to experience) dimensions, with an acceptable support value.
At the next step of our study, we could predict probability of the teammate changing in the next sessions. At this step, we had up to 67.44% accuracy in prediction.

**Table 5. Evaluation of teammate changing prediction**

| Session | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Correct prediction percentage | 43.52% | 62.11% | 67.44% | 61.76% | 57.30% | 61.29% |

**Table 6. A snapshot of mined frequent pattern**

| Neo | Condition (The value of neo) | Pattern | Support |
|---|---|---|---|
| Neo 4 | <=36 | C | 0.941176471 |
| Neo 4 | >=48 | C | 0.9375 |
| Neo 1 | >36 And <48 | C | 0.925925926 |
| Neo 3 | >=48 | C NC | 1 |
| Neo 5 | <=36 | C NC | 0.923076923 |
| Neo 4 | >=48 | C C | 0.875 |
| Neo 4 | <=36 | C NC | 0.823529412 |
| Neo 2 | >=48 | C C | 0.80952381 |
| Neo 1 | >36 And <48 | C NC NC | 0.481481481 |
| Neo 3 | <=36 | C C NC NC | 0.382352941 |
| Neo 2 | <=36 | C C C C | 0.225806452 |
| Neo 2 | >=48 | C C C C NC | 0.333333333 |
| Neo 4 | >=48 | C C C NC NC | 0.3125 |
| Neo 1 | <=36 | NC NC NC NC NC | 0.103448276 |
| Neo 1 | <=36 | C NC NC NC NC | 0.103448276 |
| Neo 1 | >36 And <48 | NC NC NC NC NC | 0 |
| Neo 1 | >=48 | C NC NC NC NC NC | 0.2 |

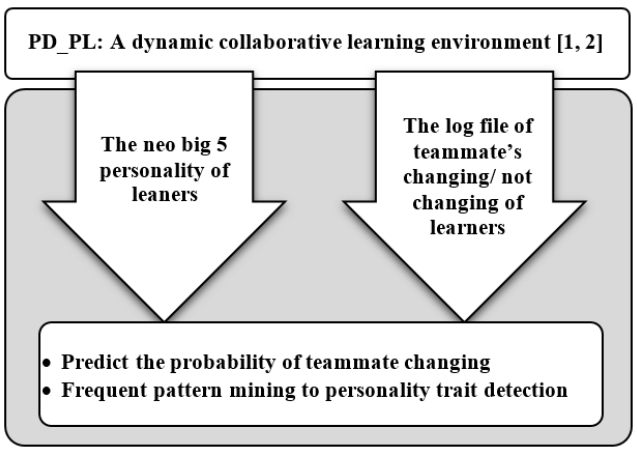


**Fig. 3. The relation between PD_PL and current research**

## Conclusion

This study was aimed at personality identification in a dynamic collaborative learning environment. For this purpose, we used the teammates' changing data of 119 students of computer engineering form a collaborative learning environment, and we conducted two study on data. At the first, we used the data to identify the personality of learners. For example we found that all people interested in the new experience have changed their peer at least twice. But the interesting thing is that despite the interest in the new experience, none of them have changed their teammate in all sessions.
At the next step, we used Laplace's rule of succession and we could predict the teammate changing up to 67/44% accuracy in predication.