

# Cooperative Learning: Adaptive Group Formation for Collaborative Learning

Mullangi Sandeep Reddy, Shri Vindhya

**Abstract:** Collaborative learning affects with lot of factors like student's personality, their interaction patterns, learning styles etc. Grouping of students is one of the important factors. It is important to arrange groups by skills and/or backgrounds. Hence it is noteworthy to create groups based on specific skills of students. Generally the students can be randomly grouped or grouped themselves. But this method of grouping students based on certain features like personality traits can improve the efficiency of collaborative learning. The student's data can be collected from social networking site like Facebook. The personality of each student can be identified by comparing the individual's chat history with psycholinguistic databases. The main objectives of this paper are to identify the student's personality. Based on that, the group of students can be formed using k-means clustering algorithm.

**Keywords:** Collaborative learning, Personality traits, K-Means, grouping.

## I. INTRODUCTION

The idea of cooperative studying, the arranging and combining of students for the aim of obtaining a studying aim has been broadly studied and defended - the word "Cooperative Studying" mentions to an guidance form in which students at different achievement stages perform as a group in tiny association approaches a ordinary aim. There is effective proof that collaborative groups aim at greater stages of thinking and sustain data deeper than students who perform silently as self. The divided studying provides students a chance to involve in conference, take accountable for their self studying, and thus develop analytical philosophers. Computer-Supported Cooperative Studying (CSCL) is a comparatively fresh instructional example among cooperative studying which uses latest electronics in a studying atmosphere to help interfere and backing association interplay in a cooperative studying circumstance

Globalization resulted multicultural education in a global environment. In a globalizing world diversity is visible in all fields including education. Educators should provide more attention to improve a unity among students. Collaborative learning is a method of determining a solution for a problem with multiple perspectives.

Hence according to those scores of above, the students can be grouped, which can be formed by applying suitable clustering algorithms.

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## II. EXISTING SYSTEM

Jian Liao et al (2008) explained how data mining may offer promise as a strategy for discovering learner's roles in CSCL. Juan I. Asensio et al (2014) depicted that the creation of a framework of software components and their associated software design patterns would provide great benefits for the development of reusable, flexible, and customizable component-based CSCL applications. Nobel Khandaker et al(2014) described that the researchers designed the multi-agent tools and techniques for Computer-Supported Collaborative Learning (CSCL) environments. Asma Ounnas et al (2008) proposed that the collaboration has long been considered an effective approach to learning. Amir Mujkanovic et al (2012) proposed that skills and knowledge that can be gained by groups of individuals will be affected by the characteristics of those groups. Shuangyan Liu et al. (2013) investigated that the recent work has highlighted how consideration of learning styles in the process of group formation for collaborative learning can have a positive impact. David Adrian Sanders et al. (2010) explained that the significant advances in automatically predicting user learning styles. Juan Yang et al.(2014) proposed a learning style prediction method based on a pattern recognition technique. Norazlina Ahmad et al.(2014) investigated that numerous studies have been carried out for the past several years concerning the promising method on automatic detection of students' learning style for a better learning adaption. Nor Bahiah Hj Ahmad et al.(2010) compared the performance of several classifiers provided in WEKA such as Bayes, decision tree and classification rules in classifying student's learning style. Yonghe Zhang et al.(2011) proposed that in CSCL research, the collaborative process is of central importance. Thus, they aimed to unveil learners' interaction patterns through analyzing context of questions in discussion transcript.

## III. METHODOLOGY

The method for adaptive group formation consists of Dataset collection and identification of Personality. Based on the above identification the adaptive group has been formed in collaborative learning environment. The various components of architecture are shown in Figure 1 as following,

### A. Dataset Collection

The dataset collected from Facebook Student Discussion forum. Here the dataset collected from the group MCA\_Tech\_Talk. The dataset collected using Facebook API. The input to collect data from facebook is page access token and its Id.

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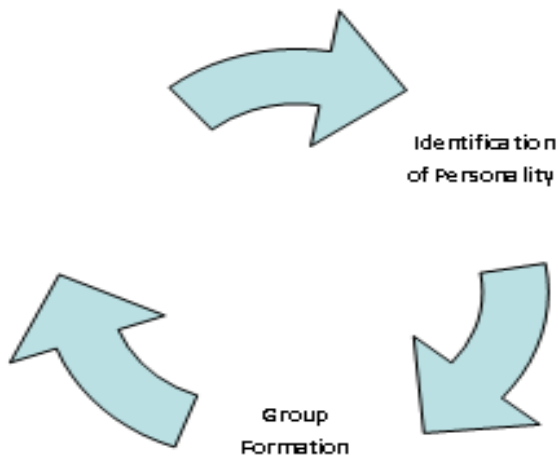


Figure 1. System Architecture for Adaptive Group formation of collaborative learning

## B. Identification of Personality

The electronic discovery of additional kinds of sensible deviation in verse and discussion, such as sentiment, misleading, talker's personality, supremacy, outlook, individuality, belief and emotion. Identities influence these other attitude of semantic creation, and thus identity identification may be beneficial. Personality is usually evaluated together with five measures known as the Big Five:

- Extrovert vs. Introversion (friendly, aggressive, cheerful, vs. remote, composed, hesitant)
- Emotional stability vs. Neuroticism (quiet, unsentimental vs. uncertain, worried)
- Agreeableness vs. Disagreeable (intimate, coordinate vs. opposing, criticals)
- Conscientiousness vs. Unconscientious (sober, arranged vs. disorganized, casual)
- Openness to experience (smart, perceptive vs. empty, predictable)

## C. Adaptive Group Formation

Here groups can be formed on the basis of K-Means Clustering algorithm. The group can be formed on the basis of different types of attributes like personality. From this the students can be clustered into different groups based on the scores obtained.

## IV. FINDINGS

### A. Data Pre-Processing

The Dataset is collected from Facebook group consists of student discussions related to studies. It is done by using Facebook API. By using API the Facebook data parsed into text files which stored in runtime dynamically. That text files further converted into database by connecting with MySQL. The text files converted into tables post and comments.

**Algorithm: To collect data from Facebook API.**

**Input:** Facebook page access token and id

**Output:** Dataset consists of details of post and comments

*begin*

Step 1: Connect the facebook page using access token and Page ID.

Step 2: The Access token can be obtained from Graph API Explorer tool of Facebook.

Step 3: Every page has an unique ID.

Step 4: Then the page details can be crawled using Facebook Page Extractor API.

Step 5: Create two tables.

*end*

## B Adaptive Group Formation Using K-Means Clustering Algorithm

The Group formation of students is the final process in this module. The Students can be grouped according to the various scores we obtained above.

By applying K means clustering algorithm the different types of cluster of students can be formed based on the scores.

### Algorithm: Group Formation using K-Means

**Input:** Score table consists of personality, interaction pattern and learning style of each student.

**Output:** Clusters of students based on their patterns.

*begin*

Step 1: The individual scores for each student can be identified.

Step 2: combine all scores into a table in database.

Step 3: Convert the database into CSV format and then into arff format

Step 4: Give the arff format file as input to the K means clustering algorithm.

Step 5: Recalculate the distance between each data point and new obtained cluster centers.

Step 6: Then the cluster of student can be formed based on applying clustering algorithm on different attributes we identified above.

*End*

## V. RESULTS & DISCUSSION

Generally the students can be randomly grouped or grouped themselves. But this method of grouping students based on certain features like personality can improve the efficiency of collaborative learning. The student's data can be collected from social networking site like Facebook. The personality of each student can be identified by comparing the individual's chat history with psycholinguistic databases. Based on above scores, the students can be grouped using K-Means Clustering algorithm.

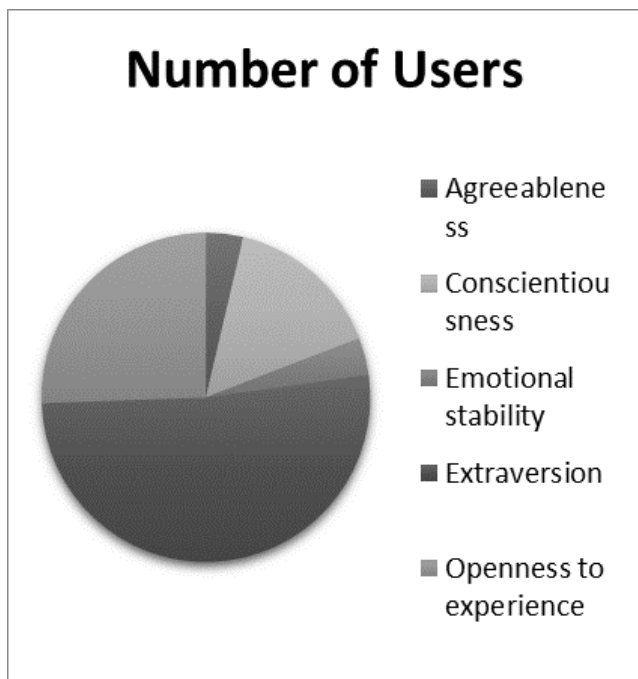


Figure 2 Chart for Identifying Personality of Users

Figure 2 denotes the users personality based on their chats. This can be identified by comparing discussion dataset with psycholinguistic Databases.

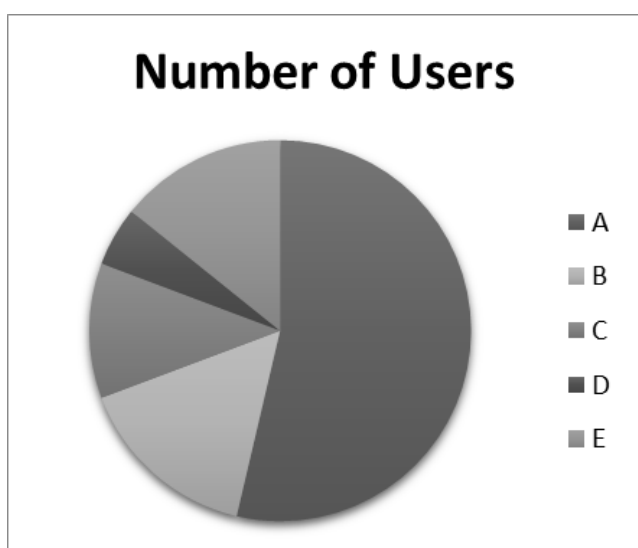


Figure 3 Chart Pdenotes the Grouping of Students

Group	Number of Users
A	117
B	34
C	25
D	11
E	31

Figure 3 denotes the grouping of users into five separate groups. This can be done by using K-Means clustering algorithm.

## VI. CONCLUSION

In this work, a new approach for grouping students in collaborative learning can be achieved. Generally the students can be randomly grouped or grouped themselves. But this method of grouping students based on certain features like personality can improve the efficiency of collaborative learning. The student’s data can be collected from social networking site like Facebook. The personality of each student can be identified by comparing the individual’s chat history with psycholinguistic databases. Based on above scores, the students can be grouped using K-Means Clustering algorithm. These methods can be used in online learning approach and in distance learning education. It helps the instructor to form groups of students based on this specific features to make effective learning.

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