

*How Highly Achieved Students Differ From the Others? A Text-Mining Approach to Personal Learning Goals*

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**Abstract**

People often set goals at the start of a new event in their life. Goals are related to performance across different domains, including sports, psychotherapy, leadership, health care, as well as education. Those students who set learning goals are found to have higher learning motivation, more persistence in learning, better course attendance, and better academic performance than their counterparts. Previous studies showed students benefited most from setting specific, challenging, measurable, and achievable learning goals than their counterparts did. While goal-setting activity appears to be an effective and inexpensive way to enhance learning performance, how learning goals vary as a function of students' course grades remains under-explored. Rather than classifying students' learning goals into pre-established categories for summative investigation, the present study adopts a text-mining approach to examine whether learning goals associate with course grades. There were 192 university students who set three different learning goals at the beginning of a semester. Results from 552 valid responses indicated that highly achieved students differ from their counterparts in expressing their personal goals. The present finding provides an opportunity for us to learn from the highly achieved students. Other theoretical advances and practical advances in education, teaching and learning will also be discussed.

Keywords: Learning Goals, Text-Mining, Learning Performance

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## **Introduction**

People usually set new goals when they want to achieve certain things, regardless of sports (Gunn et al., 2023), leadership (Rosch et al., 2014), healthcare (Lorig & Holman, 2003), and education (Elliot & McGregor, 2001). These goals are useful to guide their actions to achieve the designated outcomes. Research indicates that there is a range of benefits for students to set learning goals. Learning goals can provide students with a clear and measurable target to strive for. Therefore, setting specific, proximal goals can facilitate students to stay focused and motivated in learning (Bandura, 1986), such as their ability to manage their time, stay organized in their learning, and improve their resilience when facing academic setbacks and challenges. Achievable learning goals and action plans can also increase students' self-awareness to monitor their progress and adjust their strategies (Schunk, 1990). Setting goals can also provide students with opportunities to reflect on their own strengths and weakness (Morisano et al., 2010), which may also help them to develop learning strategies that are effective to them. In the long term, students can be trained to prioritize their tasks and manage their time more effectively. Thus, the benefits of goal setting are not only in the immediate term, but also in a longer term to improve their academic performance and increase the completion rate of academic journey (e.g., Bandura, 1986; Morisano et al., 2010; Schunk, 1990). Thus, additional research in understanding the goal-setting activities is required and would be fruitful.

In addition to the myriad of benefits associated, research has suggested that the way in which goals are framed or communicated to students can also have an impact on their motivation and achievement (Chang et al., 2011). For example, research has highlighted framing goals in terms of learning and growth rather than solely focused on achieving a certain grade or score can influence how students' approach to learning (Chang et al., 2011; Dweck, 2017). This provides the possibility for the struggling students to learn from the goals set by the highly performed students, and to base on the features of the goals that set by highly performed students to develop their own goals. Previous research has been relied mostly on surveys and questionnaires (for a review: Wigfield & Cambria, 2010). The understanding about the different features of the goals, including wordings, specificity, difficulties, and even tonal nuances have been comparatively less studied. Hence, they fall short in capturing the essence of goals of how different students set goals and fail to answer the question – whether learning goals differ between the highly performed students and the struggling students?

To answer this question, the present study attempts to explore whether learning goals vary by the course grade. Instead of collecting quantitative responses from students, we collect qualitative responses and then conduct thematic analysis to understand students' learning goals. Text mining is a process of analyzing and extracting information from large volumes of unstructured data using computational methods (Ferreira-Mello et al., 2019). It can facilitate us to discover intricate patterns and relationships inside the text, such as word frequencies, collocation of terms, and topics (Daines et al., 2018). That is, the text-mining approach will be useful for us to understand whether there are similarities and differences among highly performed and struggling students.

## **Data Collection and Analysis**

The data was collected from a group of 192 students attending a course at a university in Hong Kong. In the first tutorial lesson, they were asked to respond to the open-ended questions: *What are your learning goals in this course?* in Traditional Chinese. To respond to

this question, they completed three different statements about their goals that begin with *I want to*. After they had filled in their responses on an online platform, they received an email about these three goals such that they could check back regularly. Altogether, we have received 552 valid responses collected from 184 students. These responses were classified into four groups, The group 1 (first quartile group) are the 46 students obtained graded A and B+ in this course, group 2 (second quartile group) are the 46 students obtained B to B+ in this course, group 3 (third quartile group) are the 45 students obtained B to B-, and finally group 4 (fourth quartile) are the 46 students obtained B- to F in this course. All the students provided informed consent before they completed the goal-setting activity.

We analyzed the data with the open-source online text-mining tool Voyant Tool (Sinclair & Rockwell, 2023). As we want to retain the usage of original language, tokenization and lemmatization were not applied during the analysis. We specifically focused on two different levels, one is at the overall course level and another one is quartiles based. Focusing on the former would be useful to provide a general picture of all responses while the latter would be useful to understand the specific features of each quartile.

## **Results and Discussion**

At the overall course level, the fifteen most used words by the students in this course is summarized (see *Table 1*). For the sake of presentation, word clouds are generated with the most frequently occurred words appearing larger and more prominent in these word clouds. As students completed the goal-setting activity in their native language, another word cloud with the translated English is also provided (see *Figure 1* in Chinese and *Figure 2* in translated English).

After identifying the general trend of the usage of words, we compared the usage of words at the quartile level, the first quartile and fourth quartile. By doing this, we can reveal the quartile-based characteristics, and thus move a step forward to answer the research question – whether differences exist between highly performed (first quartile) and struggling groups (fourth quartile). Tables 2 and 3 showed the frequency distribution of the fifteen most commonly occurred words for the first quartile and fourth quartile respectively.

<b>Ranking</b>	<b>Terms</b>	<b>Translation</b>	<b>Frequency</b>
1	社會學	Sociology	126
2	教育	Education	106
3	社會	Society	97
4	學習	Learning	56
5	更多	More	50
6	認識	Knowing	49
7	科	Subject	48
8	知識	Knowledge	40
9	合格	Pass	39
10	這	This	37
11	與	And	35
12	問題	Problem	32
13	關係	Relationship	31
14	考試	Examination	26
15	對	Towards	26

**Table 1. Frequency Distribution of the Fifteen Most Commonly Occurred Words**



Figure 1. A Word Cloud of the Fifteen Most Commonly Occurred Words in Traditional Chinese



Figure 2. A Word Cloud of the Fifteen Most Commonly Occurred Words in Translated English

Students with A and B+ (n = 46)		
Terms	Translation	Frequency
社會學	Sociology	34
教育	Education	31
社會	Society	21
認識	Knowing	16
學習	Learning	16
知識	Knowledge	11
關係	Relationship	10
與	And	10
問題	Problem	10
科	Subject	9
理論	Theories	9
更多	More	9
合格	Pass	9
能力	Ability	7
更	More	7

**Table 2. Frequency Distribution of the Fifteen Most Commonly Occurred Words of the First Quartile Students**

Students with B- to F (n = 46)		
Terms	Translation	Frequency
教育	Education	32
社會學	Sociology	30
社會	Society	27
合格	Pass	15
認識	Knowing	13
科	Subject	12
更多	More	11
知識	Knowledge	10
學習	Learning	10
這	This	9
與	And	9
關係	Relationship	7
角度	Perspective	7
考試	Examination	7
對	Towards	7

**Table 3. Frequency Distribution of the Fifteen Most Commonly Occurred Words of the Fourth Quartile Students**

The comparison of the frequency distribution of the fifteen most occurred words of the overall course level yielded interesting findings, even though some similarities were observed. The fifteen most occurred words of the fourth quartile (struggling students) were directly equivalent to that at the overall course level. In contrast, the fifteen most occurred words of the first quartile (highly performed students) showed substantial differences to that at the overall course level. For example, compared to the overall course level, the word “Ability” only appeared in the first quartile (highly performed students). When comparing the frequency between the two groups, the use of the abstract word “This” and “Towards” are lower in the first quartile (highly performed students) than the fourth quartile (struggling students). That is to say, the vocabulary used by the first quartile (highly performed students) largely differs from other classmates. These findings showed that highly performed students have wider vocabulary and clearer expression of themselves when they were setting their learning goals. More importantly, it provides insight to the present research question that there are differences between highly performed students and struggling students.

## **Conclusion**

While previous research usually adopts the “orientation” frameworks to classify goals into different categories, the present exploratory study adopts the text-mining approach to explore whether differences exist between the learning goals set by highly performed and struggling students. Both similarities and differences can be observed among the learning goals set by different students with varying course grades. While verbal or visual data are yet to be captured and considered, the present study is one of the first dives towards the context and individualization of student experiences that could influence their learning goals. Further investigations could be conducted to further examine the unique characteristics of the learning goals set by different students. With sufficient guidance, learning from the highly performed students may be able to help those struggling students to optimize their academic potential, which in turn provides a more equitable learning opportunity to everyone.

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