UTILIZING SOCIAL MEDIA FOR OBSERVATIONAL GOAL SETTING

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ABSTRACT

Goal-Setting enhances learning by providing a sense of direction and purpose. Often only a few goals are suggested, as a result many learners fail to find the goals that they can relate to. To address this problem, we propose to extract a large number and variety of goals from social media. Learners can then observe goal-based messages from others and adopt the ones they find useful. Conceptually, proposed approach could be considered a combination of Goal-Setting and Observational Learning. To provide a practical implementation, we automate this process by (1) retrieving a large number of messages from Twitter, (2) classifying which of the messages contain goals, (3) determining what those goals are.

KEY WORDS

goal-setting, observational learning, data mining

1 Introduction

In sports or mechanical tasks, simple messages like "Just do it" or "Do your best" might be enough to motivate people. However this approach may not work well in learning because people usually want to know reasons why learning is useful for them [1].

Goal-Setting enhances learning by providing a sense of direction and purpose. However learners often fail to find the goals they can relate to because only few of them are suggested from their teachers or peers. Social media may help learners with a large variety of different goals but finding the right one can be difficult due to the large amount of information. That's why we want to assist learners to find their own goals and adopt them for their personal learning.

Learners look at goal-based messages as shown in Figure 1. It can give them an overview of different people's goals for learning. We want to assist learners to adopt and set up their own goals by observing other people's objectives. To accomplish this, our approach extracts goal-based messages from social media and shows them to learners so that they can observe a variety of goals and adopt the ones they find useful. Our approach combines two concepts: (1) goal-setting and (2) observational learning.

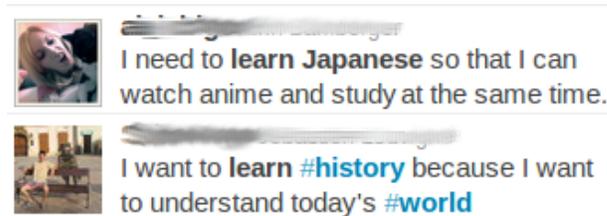- ***Goal-Setting:*** Many research works about goal-setting theory have been summarized by Locke [2]

Figure 1. Goal-based motivational messages. Learners can observe goal-based messages on Social Media. We want to assist them to adopt and set up their own goals.

who shows that this theory has been proved to be effective and successful. People will use existing knowledge and skills to develop coping strategies for unknown or new tasks and to attain their goal [3]. People with higher self-efficacy develop better strategies than when people are just told to do their best. Hence with better strategies their performance will improve. Goal Setting is represented by several attibutes (performance, achievement, satisfaction) which affect and evaluate the learning experience.

- ***Observational learning:*** Motivation is crucial for observational learning to emerge in action and behavior. Bandura published a theory in which he views people as self-organizing, self-reflecting, self-regulating and proactive agents which determines the relationship between humans behaviors and their environment [4]. He also explained that observational learning is markedly influenced by four processes: Attentional, Retention, Motoric reproduction and Motivational processes [5]. Incentive or Motivational processes activates learning while negative sanctions or inadequate reinforcement rarely does, even with skills and capabilities.

Modeling: Within all messages on social media, even motivational ones, only a few contain goals. We mine large-scale social media to retrieve a large variety of goals and show them to learners. We used Twitter as a social media. Our practical implementation (1) collects a large number of messages from Twitter, (2) classifies those containing goals, (3) determines what those goals are.

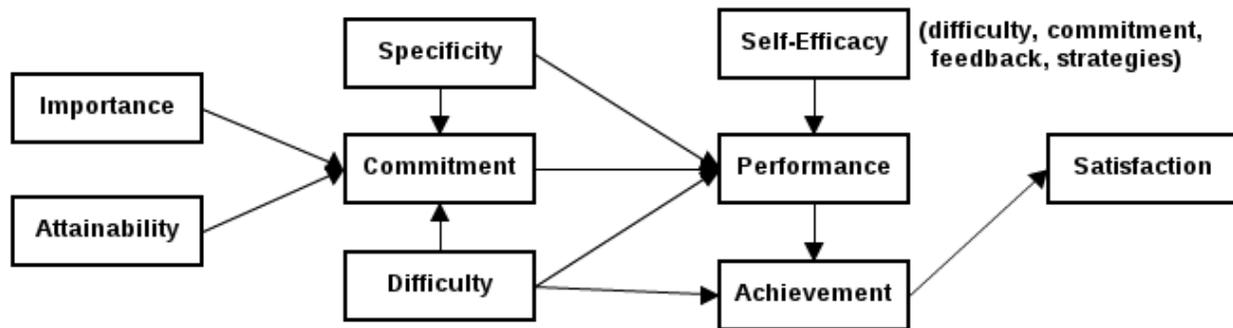We refer to the proposed theory as Observational Goal

Figure 2. Goal Attributes. This diagram shows the different goal attributes and how they influence each other. We notice the high importance of Self-efficacy and Commitment on overall Performance. Satisfaction represents the final outcome which means that if learner is satisfied, learning is successful.

Setting. We first review Goal-Setting (Section 2.1) and Observational Learning (Section 2.2) theories to demonstrate their influence in the learning process and how combining them may improve learning experience. We describe next how these two theories can be combined in an implementation (Section 3). We utilize Social Media in order to show a variety of goal-based motivational messages to learners. By observing different goals and adopting the ones they consider useful learners can improve their personal satisfaction and their chances of success in their own learning process. Figure 3 shows an interface showing only goal-based motivational messages to learners separated in distinct groups depending on a common objective.

2 Related Works

Many sudies describe the different types and effects of goals, and demonstrate their importance in self-regulated [6] and academic learning [7]. Locke and Latham [8] state that goals only urging people to "Do your best" have no external referent and, therefore, people won't "do their best". In fact they will be satisfied enough with an acceptable level of performance because of the ambiguity of the task, but this level could be higher with a more specific goal.

In this section we give an overview of Goal-Setting theory to demonstrate its crucial influence on learning performance. We describe next how Observational Learning may affect people's behavior.

2.1 Goal-Setting

This section gives an overview of previous research on Goal-Setting demonstrating the crucial influence on learning and on performance in learning. Figure 2, described in more details further below, shows the affect of the different goal attributes and how they eventually lead to personal satisfaction. Bekele [9] summarizes studies about satisfaction and motivation in Internet-Supported Learning Envi-
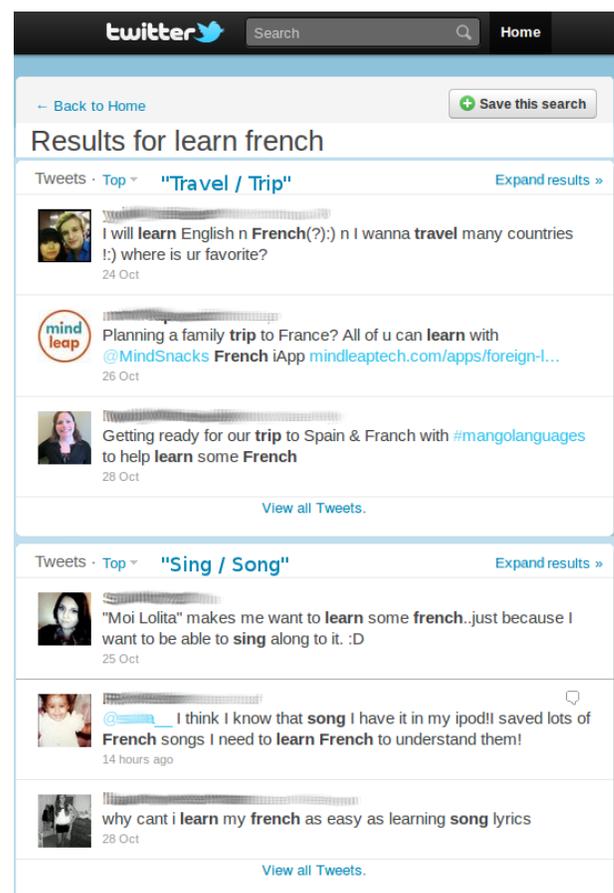

Figure 3. Observation Goal Setting Implementation. We want to show learners a list of goals in separated groups to let them focus on the goal they might adopt (usernames are blurred to preserve privacy). Process is summarized in Figure 6 and detailed in Section 3.2.2.

ronments. In addition, Samuelson [10] recently noticed that lacking motivation is a large cause of education failure. This also proves the important effect of Goal-Setting on the success of learning. In fact, goals affect learning because they enhance performance through four mechanisms: direction, effort, persistence, and behavior [3].

As stated previously, goal specificity gives a direction to learners and leads to higher performance than ambiguous tasks. In fact, learners with more specific tasks can better control their performance on them, even though this might limit learning on the general domain the given task relates to [11]. The degree of effort determined when setting goals and utilized when working on the task is described as influencial for both physical and cognitive tasks in several studies [3] [4] [6]. Persistence and commitment are important factors in goal setting as they complement effort required to complete the task and the time given affects the importance of each of these two mechanisms [7]. The same studies previously cited all mention the affect of goals on behavior by giving to individuals information about the relevant knowledge and strategies to attain the goals.

In his excellent review Locke [2] summarizes previous research about goal setting and gives a list of different goal attributes. Combined with other previous studies, we intent to show these attributes in Figure 2 and how they interact and influence each other. At first, we can see that a goal defined as important and fully or partially attainable leads to high commitment. Self-efficacy is defined as the belief in oneself's abilities to perform a task [4]. It indirectly influences self-commitment because people with high self-efficacy are more likely to set more challenging goals, use better strategies, and respond better to negative feedback [12]. In regards to feedback, showing progress to the goal is an important feedback to individuals making their goal setting more effective. Goals that are both specific and difficult lead to highest performance because they require and generate higher commitment, in opposition with ambiguous goals such as "do your best". We can see that many attributes directly or indirectly affect performance, hence achievement since it is well established that the two are connected [13].

Figure 2, like several previous studies, shows that goal attributes eventually affect personal satisfaction. As said at the beginning of this section, satisfaction and motivation are important factors to ensure a success in learning and therefore its absence may lead to education failure, which demonstrates that setting relevant goals is essential for learning.

In the next sub-section we briefly describe Observational Learning theory before explaining how these two theories could be combined with Social Media (Section 3).

2.2 Observational Learning

Observational Learning is now a well established type of learning defined from Bandura's Social Cognitive Theory [4] where he views humans as self-organizing, self-reflecting, self-regulating and proactive agents. These capacities for observational learning enable humans to expand their knowledge and skills as a result from observing, absorbing and reproducing behaviors executed by others.

Observational learning is governed by four categories of processes in order to successfully model behaviors observed from others [14]:

- **Attentional processes** define the factors influenced when modeled behavior and cognitive skills are observed by an individual.

- **Retention processes** concern cognitive representations or the process of transforming and restructuring information from observed models.

- **Production processes** translate, construct and adapt behavior patterns to generate new behavior.

- **Motivational processes** relate to whether people are motivated or discouraged by behaviors from others. Observational Learning's performance is influenced by direct, vicarious, and self-produced incentive motivators. That explains why individuals will be more likely to adopt behavior from people similar to themselves and experiencing success.

These categories justify why new behavior can be adopted from Observational Learning theory. In particular, motivational processes provide incentives of self-motivation and self-satisfaction which influence self-efficacy, individual's belief in his own capabilities.

We can see a connection between Observational Learning and Goal Setting theories. The personal perception, organization and regulation of external social elements influences self-efficacy [4]. In addition people with high self-efficacy tend to set higher goals, find and use better strategies and respond more positively to negative feedbacks [12].

Therefore, in the next section, we describe how these two theories can be combined to improve satisfaction and performance in a learning experience with our practical implementation utilizing Social Media.

3 Observational Goal-Setting theory

People often have different goals and motivational orientations for learning [1]. In traditional academic learning environments goals are suggested by teachers or peers but learners may not relate to them. This might be because only few goals are proposed and they don't fit with learners' skills or interests. This matter is more important in Informal Learning because the learning environment does not provide specific outcomes originally stated to learners who therefore may not have specific goals. They have to define their outcomes and objectives by themselves. Learners should be able to set up their own goals for self-learning if they could observe a variety of different goals.
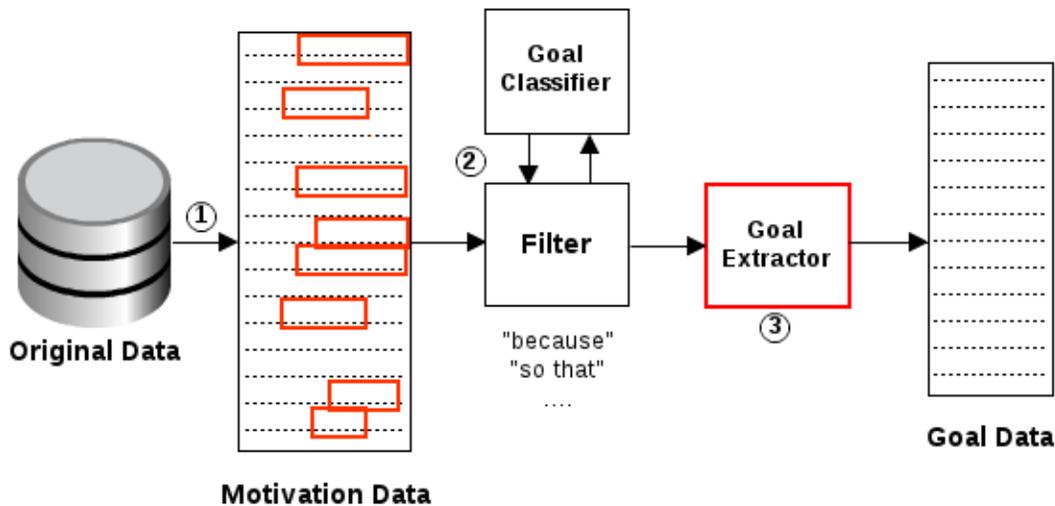
Figure 4. Goal and Motivation classifiers diagram. We (1) extract motivational data from our Twitter large-scale dataset, (2) filter goal-based messages, and (3) determine what is the goal. Goal Data is used next as input in the application that will show goals to learners (Figure 6).

As a consequence we decide to combine Goal-Setting and Observational Learning theories. Utilizing Obervational Goal Setting theory, we show learners a variety of goals from others that they can observe and adopt the ones they will consider useful. We describe in this section how we implemented this theory utilizing a large-scale dataset collected from Social Media.

To assist learners setting up their own goals with observational goal setting we decided to (a) collect a large-scale dataset of goals from social media and (b) display those messages. Learners can observe different goals from peers and adopt the ones they consider useful for their personal satisfaction.

We describe how we built our dataset (Section 3.1) and the methodology to identify messages containing goals (Section 3.2).

3.1 Large-Scale Dataset

In order to present a variety of goal-based motivational messages to learners we want to use a large-scale dataset. To the best of our knowledge, if many goals are scattered across the Web, no motivational or goal corpus is currently available and therefore we decided to build our own dataset.

Large amount of data is publicly accessible on social media where people can share their personal sentiments, motivations and goals. We use this information available on social media to collect a large variety of goals expressed and shared by different people.

To obtain a large variety of goals we first constructed a large-scale dataset from social media collecting information related to learning. We chose Twitter as our data source for the following reasons:

- It consists of short text messages (which helps to limit the focus),

- Metadata contains user profile (useful for personalization) and social network information (useful for social network analysis such as identifying peers and monitoring message diffusion and adoption),

- Large amount of data is publicly accessible (which helps to create a very large-scale original dataset before filtering and classifying goal-based motivational messages).

Figure 5. Twitter messages. For a same topic, only few messages, even motivational, contain goals (e.g. 5 & 6). From the data collected we filter and classify only messages containing goals (usernames are blurred to preserve privacy).
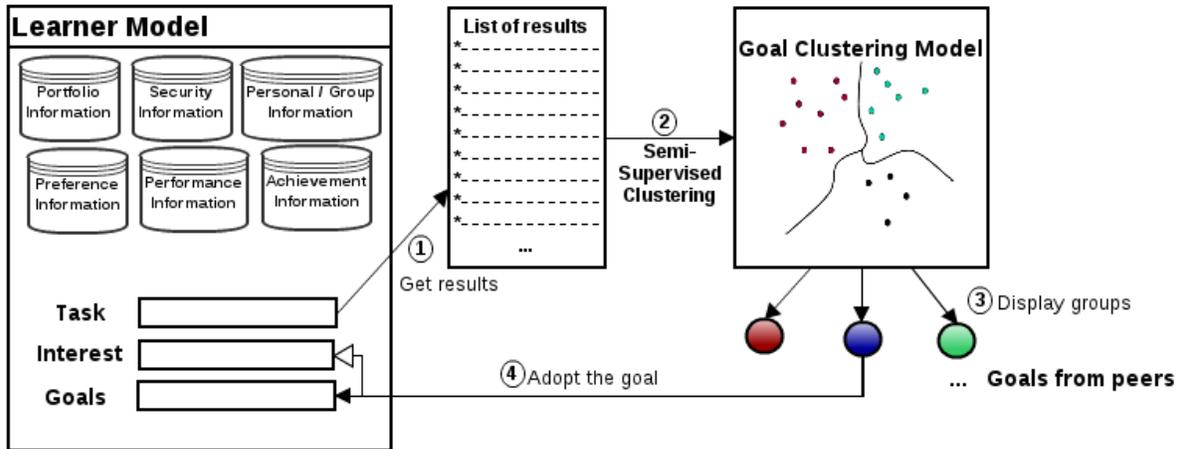
Figure 6. Proposed Observational Goal-Setting process. After extracting from goal-based dataset (Figure 4), they will be separated in distinct groups to show learner different categories of goals on the same topic. Learners will then observe a variety of goals and adopt the ones they consider useful.

We use our TwitterPuller [15] to collect real-time stream data. Because we focus our research on learning we only selected messages containing learning concepts or subjects with related keywords (e.g. "learning", "learn", "algebra", "language" etc.) and motivational concepts, which represents a dataset of more than 10,000 messages. We utilize machine learning and semi-supervised clustering methods to list goal-based motivational messages to be observed by learners.

3.2 Methodology

We can see in Figure 5 a list of Twitter messages about the same subject (e.g. learning French language) but these messages don't always contain goals. Messages 1 to 4 are examples of factual information when people are only sharing a fact, material or an interest without expressing a specific goal. However messages 5 and 6, in addition to be motivational, express some goals. Both users express wish to learn French, one to have a business partner, the other for a song. This sample shows that within numerous messages about a same topic, learners may observe different goals from others within non-motivational messages. Once they see goal-based messages, they can adopt one or several goals that fit their objective, skills and/or interests to create or improve their personal satisfaction for learning.

We first explain in this section how we classify messages containing goals within our large-scale dataset. We describe next the process of how this goal-based dataset is used to categorize goals and show them to learners who can then observe and set up their own goals.

3.2.1 Goal Classification

Our objective is to let people observe goal-based messages from peers. Figure 4 shows that we utilize (1) a Motivational Corpus [16] created from a large-scale dataset collected on Twitter, and containing motivational messages. We use (2) a goal classifier to determine which messages within the motivational ones contain goals and which part of the message is the goal. Eventually we determine (3) what the goal is.

Twitter has the advantage to limit the length of messages to 140 characters which makes it easier to focus on the information we want. To filter the data estimated as motivational we utilize a goal filter based on textual and conceptual features. Textual features are keywords used to process data that imply some goal (e.g. "because", "so that", "goal is", etc). We determine conceptual features by using methods to estimate different concepts contained within messages, such as the commitment, the engagement or the difficulty of the task.

3.2.2 Goal Categorization

Figure 4 describes the classification process used to determine which messages contain goals. As an input we use data collected from social media Twitter and filtered to keep only motivational messages. We obtain only goal-based messages after classification. This outcome dataset is used as an input in our proposed Observational Goal-Setting process summarized in Figure 6.

When learners search for results about a given topic, our system will display selected goal-based messages after categorizing them into distinct groups. We use semi-supervised clustering methods to separate messages into different groups based on common goals. The interface

will let learners modify this categorization if some messages are better considered belonging to a different group. An example of interface is shown in Figure 3.

Learners will then be able to observe a large variety of different goals and to adopt the ones that fit their objective, interests, skills. We proved earlier that Goal-Setting is essential and efficient for learning, and we showed that goals observed from a list of results may help learners setting up their own objective for learning and finding motivation to start or pursue their work, or improve their personal knowledge.

4 Discussion

Both Goal-Setting and Observational Learning theories are proved to be efficient on learning. We summarized in this article previous studies about these theories to demonstrate that combining them in Observational Goal Setting will make learning even more efficient. Our practical implementation displays a variety of goal-based motivational messages to learners who observe them and adopt the ones they will consider useful for their personal learning experience and satisfaction. By adopting observed goals, learners will be able to find some new interests to enhance their learning. Some learning methods might work well for the majority of people but not for some others who have different goals. By observing other people's goals, learners will be able to adopt their own ones that will make their learning experience more efficient and satisfactory.

The interface described in this article will be used to evaluate the Observational Goal-Setting theory. We want to use questionaries to get learners' feedback about their goals for learning, before and after using this application. We want to confirm by this way that observing goal-based motivational messages from others to set up oneself's own goal helps developing interest, motivation, commitment and eventually improve learning performance and satisfaction. Thorough evaluation will be conducted in the future.

Possible future works include displaying motivational goal-based messages in structured groups based on similar goals. This will let learners focus on a specific objective and concentrate on information estimated by the system as useful for them. We can also try to personalize goal factors to define how attainable and adoptable goals are. Learners might eventually find a method or material that will better fit their learning capabilities. As previously stated, feedbacks showing learning progress is important and makes goal setting more efficient so future implementation should provide to learners a measurement of their improvement.

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