The effects of teaching style on student recall

Alexander Urquhart (alexander.urquhart@hult.edu)
Hult International Business School

Nicholas Wake
Hult International Business School

Amanda Nimon Peters
Hult International Business School

Abstract

This research studied the relationships between teaching style, student mood, and learning. Seventy-nine Master's of International Business students were taught two subjects in an Operations Management course. The first subject was taught in a dynamic, high-energy style; the following subject was taught in a more traditional, low-energy style. Students completed a mood survey after each subject, and a pop quiz was administered two days later. The surveys showed no significant change in student mood between high- and low-energy lessons. Students with a more positive mood significantly outperformed students with a more negative mood on the quiz, however ($p < 0.01$).

Keywords: Emotions, Recall, Pedagogy

Introduction

Academic learning and achievement are critically important to students in higher education. The lecture theatre stimulates a range of emotions with the potential to impede or enhance engagement, motivation, and cognitive learning. Research suggests that by actively managing classroom emotions, teachers can substantially influence students' learning process and academic success (Titsworth et al., 2010; LeFebvre & Allen, 2014). This study tests the impact of high- and low-energy teaching styles on student emotional engagement in the classroom, and the impact of classroom emotional engagement on information recall.

Bandura's (1986) social-cognitive theory of learning suggests that learning is a highly social activity. The ways in which students and teachers interact, and the methods and teaching materials used in class, will affect both student mood and learning. Peer learning, for example, improves motivation and learning outcomes (Griffin & Griffin, 1998; King, 1998; Kim & Baylor, 2006). In social and emotionally engaging classrooms, therefore, it is expected that learning and recall will be improved.

This study analyses the interplay between teaching style, emotions, and learning. University teaching increasingly embraces unorthodox methods as a dynamic break from the tedium of the traditional experience. There is an expectation that high-energy teaching methods (such as in-class simulations and a high level of teacher-student interaction) will

create more lasting impressions of the subject material, leading to better recall and better academic performance. Evidence that these new methods are an improvement is emerging but imperfect. Many studies use short-term stand-in tasks—such as reading comprehension or memorization of word lists—as proxies for the long-term, complex process of learning and recalling a lesson. Other studies relate emotional assessments to overall academic performance. These studies have made important contributions to understanding the dynamics between emotion and achievement, but relatively few have examined teaching methods in a true classroom setting, and their effect on learning (Titsworth et al., 2010; LeFebvre & Allen, 2014; Morgan et al., 1988). In this study we analyse how teaching style affects classroom mood, and how the resulting mood affects learning.

Classroom factors affect mood

Non-traditional teaching methods such as simulations and "serious games" used for learning have been shown to be more effective for learning and retention than traditional teaching techniques (Wouters et al., 2013). Such games were more effective learning tools when played in groups, as opposed to alone (Wouters et al., 2013). Serious games do not increase motivation, which is surprising in light of the "positive intrinsic motivation" theory of Pekrun (1992). However, positive emotions experienced during these social experiences may nonetheless decrease the effects of negative and learning-destructive emotions such as stress (Hromek & Roffey, 2009; Tugade & Fredrickson, 2004).

Hoover (2010) showed that experiential or "whole person" learning improved MBA students' ability to learn executive skills such as leadership, teamwork, communication and decision making. Using actors in simulated high-intensity scenarios—for example, terminating an angry employee—Waller (In Press) found that experiential programs produce significant and durable learning. Participants in her experiment wore heart rate monitors, and a high change in heart rate was correlated with perceived learning even a month after the simulation.

In addition to such non-traditional teaching methods, verbal and nonverbal teacher communication in the classroom are crucial to managing student emotions. A professor's abilities to effectively listen and respond to students, as well as to foster an engaging atmosphere, are in particular associated with improving students' emotional experience of the classroom (Titsworth et al., 2010; McCroskey et al., 1996). A significant body of work has shown that such skills will reduce student anxiety, increase motivation and improve cognitive and affective learning (McCroskey & Richmond, 1992; LeFebvre & Allen, 2014; Hsu, 2010; Ballester, 2015).

Physiological responses to emotions, such as facial expressions, are hardwired into our brains (Purves et al., 2004; McHugo et al., 1985), and students will pick up on a professor's emotions from body language cues (Gladwell, 2006). If there is an emotional mismatch between professor and students, "emotional convergence" may occur as social mimicry and feedback cause the two to approach a similar emotional state over time (Dallimore et al., 2007; Hatfield et al., 1993; Pugh, 2001). Applying such concepts around interaction and interactive learning, professors should be able to effectively manage the mood of a classroom in order to improve learning conditions.

Hypotheses

Two hypotheses were identified from the literature and tested during the research:

Hypothis 1
A dynamic teaching style using simulations a high level of professorial engagement and energy will improve student emotions in the classroom, while a traditional, low-energy style will shift student emotions toward neutral.

Mood can improve or impair learning
A negative mood has a net negative impact on overall learning, either by directly impacting the mechanisms of cognitive learning, or by reducing motivation to undertake the difficult task of learning. The effects of anxiety on academic success—specifically the negative effects of test anxiety—are perhaps the most well documented of these emotions (Alpert & Haber, 1960; Sarason, 1957; Stöber & Pekrun, 2004). El-Anzi (2005) recorded a negative correlation between pessimism and overall academic achievement in university students. Ellis et al. (1997) experimentally induced a depressive mood in participants and showed that such a mood reduced reading comprehension. Motivation improved comprehension but did not overcome the effects of the depressive state.

Positive emotions, on the other hand, are linked to improved cognitive and learning outcomes such as creative thinking (Fredrickson, 2001; Isen et al., 1987). El-Anzi (2005) showed that academic achievement is positively correlated with optimism and self esteem. By reducing distracting irrelevant thoughts and increasing motivation, positive emotions can also counteract some of the cognitive impairment of negative moods (Pekrun, 1992). To improve concentration, creativity and recall, therefore, professors are recommended to engender positive emotions in their students.

Hypothesis 2
Students with more positive emotions in the classroom will learn better and be better able to recall information than students experiencing more negative emotions.

Experimental Design
Participants were seventy-nine Masters of International Business students, all enrolled in the same Operations Management course. On Day 3 of the ten-day course, students were split into two randomly selected groups. Each group was separately taught the same two subjects under two different teaching conditions (Table 1) over a 90-minute period. Group A was taught Subject 1 in a dynamic, high-energy fashion, followed by Subject 2 in a more traditional fashion; Group B was taught the same two subjects in reverse order, starting with dynamic, high-energy conditions for Subject 2 and ending with Subject 1 under traditional conditions. The two teaching styles were expected to simulate high and low emotional engagement from students.

Each group's high-energy lesson was conducted in a dynamic learning environment that included collaborative group simulations ("serious" or "learning" games), movement around the room, and background music playing when students entered the classroom. When lecturing, the professor used engaging visual aids and jokes, as well as open and approachable body language such as smiling, laughing and moving around the classroom.

Following the dynamic lesson and a short break, each group received the next subject in a "traditional" lesson presented only through lecture and PowerPoint. Students entered a quiet classroom and remained in their seats throughout the lecture. Information was presented forthrightly by a staid instructor without group work or simulations. The instructor maintained neutral body language without excessive smiling or movement around the classroom.

After every lesson, students completed a survey to assess their emotional state on a seven-point scale from "Very negative" to "Neutral" to "Very positive." Two days after

the lessons, students were given an optional but unannounced quiz testing their recall of Subjects 1 and 2. Of the 79 participants, 69 completed this pop quiz.

A teaching assistant was present during each lesson to ensure that acceptable teaching quality was maintained. The assistant did not know which lessons would be taught in which styles, but was independently able to correctly identify the change in teaching style. The quiz grader was blind to which quizzes came from which group.

Table 1 – Features of "dynamic" and "traditional" teaching techniques

Dynamic (high emotional engagement)	**Traditional (low emotional engagement)**
• Simulations and high-involvement work • Positive body language • Laughter and use of jokes • Explanation of benefits of the concept • Use of video content during lecture • Verbal reinforcement of learning techniques (e.g., "a fun simulation," "you will enjoy this") • Use of simple example to start class • Passionate delivery	• Lecture and PowerPoint slides only • Neutral body language • Minimal laughter or joking • Explanation of limitations of the concept • No video content • Verbal recognition of challenging concepts (e.g., "this may be difficult," "this requires maths") • No simple example to start the class • Neutral delivery

Results

The teaching assistant confirmed that the two class sessions were noticeably different. He noted a "dull" atmosphere during the traditional lesson, which contrasted with the dynamic lesson's "rowdy" atmosphere and "clapping and whooping [as] goals were achieved" during simulations.

Classroom emotions were measured on a mood scale from –3 ("Very negative") to +3 ("Very positive"). Subject-specific learning was assessed by performance on the pop quiz, where students could score from 0–10 on each subject. Survey results and recall scores for each group and subject are summarized in Table 2.

Mood

A paired t-test shows that the change in average mood between lessons is not significant either for Group A ($t(33) = 0.90$, $p = 0.37$) or for Group B ($t(44) = 0.45$, $p = 0.65$). Two-sample t-tests show that the difference in average mood between Group A and Group B is significant, however. Group A had a higher average mood (mean = 1.29, SD = 1.12) than Group B (mean = 0.78, SD = 1.13) after the dynamic lesson ($t(72) = 2.03$, $p = 0.05$). Group A continued to report a higher average mood (mean = 1.38, SD = 1.07) than Group B (mean = 0.84, SD = 1.07) after the traditional lesson ($t(71) = 2.21$, $p = 0.03$).

Recall

Two-sample t-tests show that students in Group A scored significantly higher in both subjects than the students in Group B. On Subject 1 (balance loss), Group A averaged 7.8 (SD = 3.2) compared to Group B's 6.1 (SD = 3.8) out of 10 ($t(62) = 2.03$, $p = 0.05$). On Subject 2 (queue design), Group A averaged 3.1 (SD = 3.0) compared to Group B's 1.17 (SD = 1.6) out of 10 ($t(36) = 3.11$, $p < 0.01$). The combined score for Group A (mean = 10.9, SD = 5.2) was significantly better than for Group B (mean = 7.3, SD = 4.0; $t(45) = 3.12$, $p < 0.01$).

Table 2 – Average self-reported mood (from –3 to +3) and average recall score (out of 10). Note: Group B first learned queue design dynamically, then balance loss traditionally.

	Subject 1 (balance loss)	**Subject 2 (queue design)**
Group A	*Dynamic teaching* Average Mood: 1.29 Average Score: 7.8	*Traditional teaching* Average Mood: 1.38 Average Score: 3.1
Group B	*Traditional teaching* Average Mood: 0.84 Average Score: 6.1	*Dynamic teaching* Average Mood: 0.78 Average Score: 1.2

Discussion

Hypothesis 1

Hypothesis 1 predicted that teaching style would affect student emotions: Dynamic teaching methods would improve students' moods; traditional teaching methods would shift students toward a neutral mood.

This hypothesis is not supported by the results of the mood surveys. While students were expected to exhibit a positive mood after the dynamic lesson, the traditional lesson was expected to induce a noticeable shift toward neutral mood. Although there was a clear difference in teaching styles as the professor shifted from high- to low-energy teaching, neither group exhibited a statistically significant change in mood.

An explanation for this could be that emotionally impactful events unrelated to the classroom—for example, a job offer or illness—may be more significant. Such major events could easily overwhelm the effects of teaching style in determining a student's mood. In addition, students had already experienced three lessons with the professor before he suddenly switched to the traditional teaching style. Research shows that an established emotional connection is difficult to break (Zomerdijk & Voss, 2010; Liljander & Strandvik, 1997). The relationship between professor and students may already have been strong enough to endure the short-term change in teaching style without significantly impacting the emotional experience of the lesson.

Hypothesis 2

Hypothesis 2 predicted that students' moods in the classroom would affect their learning, as measured by information recall on a pop quiz. A good mood was expected to create more emotional engagement with the material and thus improve learning.

This hypothesis is supported by the data. Group A exhibited a significantly better mood than Group B during both subjects, regardless of teaching style. Group A also outperformed Group B on both subjects, regardless of the conditions under which the subject had been taught. This supports the hypothesis that "happier" students learn class materials more effectively.

Each group was expected to out-perform the other group in the subject that had been taught to it dynamically. Thus Group A would outperform Group B on the balance loss section of the quiz, and vice versa on the queue design section. Instead, one group maintained a better mood during both subjects and outperformed the other group on both subjects. Whatever factors control student mood therefore appear to overwhelm teaching style in determining the student's learning.

Wouters et al. (2013) found that employing serious games in the classroom improved student learning and retention. These results do not contradict that finding, but they suggest that the impact of mood—especially as it may be affected by strong external factors—overwhelms the learning benefits of serious games.

Conclusions

This study does not conclusively show that dynamic, high-energy teaching has a significantly different impact on student mood than traditional, low-energy teaching. The study does show, however, that student mood during a lesson significantly impacts recall ability: Students that were happier during class were better able to recall information two days later.

This implies that teachers should attempt to constructively manage student emotions within their classroom, but that teaching style alone may not be enough. Teachers and schools wishing to optimize student learning would do well to consider other methods of managing classroom emotions. At an institutional level, this could include wellness or stress-reduction programs. At the individual level, however, teachers wishing to exert more direct control of their classroom could consider additional short-term techniques. Such techniques could potentially be as simple as playing a short, "feel-good" video at the beginning of class. This was a pilot study. Follow-up studies are planned, which will test additional methods of inducing a better mood and higher emotional engagement in students in order to improve their learning.

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