One Size Does Not Fit All: Individuality and Perceptions of Improvement and Satisfaction Among TE Students

凡事不能等量齊觀:個體差異與對語言程度提升的看法和滿意度

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Abstract

Academic self-regulation is a key factor for motivation and learning achievement. Yet with the large range of individual factors, this is not a one-size-fits-all proposition. This study of L2 Technical English students at two German universities explored learners' expectations and motivations, in particular regarding self-regulation and self-efficacy via the individual's time investment in self-led study. In an initial survey, learners ($N=1646$) reported on their English skill levels and anticipated learning habits. Complementarily, the retrospective survey investigated learners' ($N=796$) actual behavior during the course, their perceptions of language skill improvement, and their satisfaction. The initial survey indicates a clear understanding that time investment in self-regulated study will lead to greater improvement, an outcome confirmed in the retrospective survey. Additionally, students who invested more time in their coursework were more satisfied with their achievement, although most learners acknowledge they should have studied more. The results verify that learners recognize the nexus between self-regulation and language skill improvement, yet university students are not satisfied with their capacity to self-regulate their language learning strategies. While differences in students' skill levels and academic self-efficacy result in divergent degrees of progress, students of all types report benefits to their language skills when motivated to self-regulated study.

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摘要

自我調節是學習動機和學習成就的關鍵因素,然而由於個體因素的範圍廣泛,這項主張無法一體適用。本文以德國兩所大學L2技職學生為研究對象,探討了語言學習者期望與動機,並特別聚焦於自主學習時的自我調節與自我效能。在最初的調查中,學生(N=1646)先陳述了他們的英語程度和預期的學習習慣。此外,筆者也透過回溯性調查探究學生(N=796)在課堂上的實際表現以及對語言程度提升的感受與滿意度。初步調查結果顯示,學生在自我調節學習中投入的時間與進步幅度成正比,這項結果也在回溯性調查中得到證實。同時,投入較多時間在課業上的學生,對自己的成績更為滿意(儘管大多數學生承認他們應該花更多時間在學習上)。本研究結果證實了學生知道自我調節與語言技能提升之間的關係,然而大學生對自己的語言學習策略及自我調節能力並不滿意。雖然學生在語言程度和自我效能的差異導致了進步程度的不同,但各類型的學生均表示在自我調節學習的過程中,他們的語言能力皆有所受益。

Keywords L2 English · Technical English · Self-efficacy · Self-regulation · Motivation

關鍵詞 以英語為第二外語 · 技職英語 · 自我效能 · 德國英語學習者 · 自我調節 · 動機

Introduction

More so than at other levels of education, the tertiary-level language classroom encompasses a combination of learners with heterogeneous biographies, skill levels, expectations, experience, goals, and learning strategies. This pronounced level of learner individuality has a discernible influence on language learning achievement.

The didactic challenge lies in presenting such disparate groups with a curriculum enabling the maximum potential language learning achievement of each student. Among language specialists, individual factors such as motivation, self-efficacy, and self-regulation have a well-recognized and pronounced impact on a learner's progress, but are learners aware of the roles these play in their own language skill development? How can the language instructor accurately perceive and activate their students' motivation and self-regulated language learning aptitude? Finally, and equally importantly, how can each student obtain their own optimal language learning progress, given these established individual differences in intrinsic motivation and strategic language learning capacity?

This bipartite study consists of an initial survey (before the course; $N=1646$) and retrospective survey (at the end of the course; $N=796$) of self-reported values for expected and actual self-regulated study, English-language skill progression, and learner satisfaction. Due to the large sample size, reliable descriptors and predictors for the behaviors and achievement of individual learner groups can be identified. As such, educators can apply these broad and robust findings in order to best respond to the motivational needs and learner expectations of the individual personalities presenting in their language classroom and accordingly develop appropriate curricula. Such a course would presumptively resonate with a broad spectrum of learners and enable them to experience noticeable improvement in their language competence based on their individual traits and learning styles.

The current investigation into motivation, self-regulated learning, and skill progression builds on a longitudinal study which has thus far addressed the influence of biographical factors on academic success in Technical English [20], the identification of and support for

learners who might profit most from self-led learning [23], and international perspectives on topics Technical English students find most relevant and motivational [24]. The research agenda serves the overarching goal of extracting robust conclusions for effective learning and teaching strategies for individualized language-learner groups delineated within the large-scale investigation.

Self-regulation, Self-efficacy, and Motivation

This investigation focuses on the complex relationship between language development, time investment in self-regulated individual study, and perceptions of personal competence, progress, and satisfaction. Underpinning the study is the assumption that significant factors for academic success are learner motivation [40, 41] and the engagement of the learner with regard to self-efficacy and self-regulation. The concept of academic self-efficacy, characterizing the individual's faith in their abilities to organize and execute the tasks associated with academic performance, has been shown to have a significant influence on learning [29, 30]. Equally, self-regulation, or the process of activating and sustaining behaviors in pursuit of a given goal [33], results in enhanced skill throughout the learning process [32]. There is increasing consensus that self-efficacy and self-beliefs induce higher learner motivational levels, which in turn feed into higher self-efficacy, more positive self-beliefs, and overall greater learner satisfaction [6, 10].

The factors of motivation, academic self-efficacy, and self-regulation have received significant attention with respect to language learning in particular. The (self-)regulation of language learning processes is primarily associated with the application of language learning strategies [15, 19, 34]. More specifically, self-regulation is a dynamic concept referring to the extent to which an individual can actively manage their language learning process through strategic efforts and specific beliefs or practices ([11, 45]; see [38], and [44], for extended discussions of learner strategies and academic self-regulation in second language acquisition).

Meanwhile, self-efficacy characterizes language learners' dynamic beliefs about their ability to successfully perform a task based on experience and perceived competence [5]. High self-efficacy is associated with a learner's improved cognitive, behavioral, and motivational engagement in the classroom [27]. Taken together, self-efficacy for self-regulation is understood as the learner's beliefs in their capability to appropriately and successfully employ metacognitive learning strategies to effectively monitor their academic progress [6]. As such, academic self-efficacy plays a decisive and demonstrable role in an individual's language learning achievement ([42], see also e.g. [1, 31]). Self-regulated learning strategies and self-efficacy can create a positive cycle for a learner's motivation. For example, positive beliefs about language learning abilities (self-efficacy) lead to more successful language learning strategies, which in turn promote feelings of self-efficacy [43].

This study crucially seeks to investigate learners' anticipated and reported time invested in self-regulated individual study outside of the classroom and to identify factors influencing this behavior. Reflection upon the learner's level of satisfaction with their investment in self-led study provides insight into the perceived relationship between behavior and learning achievement.

RQ1: How much time do learners anticipate (initial survey) and report (retrospective survey) investing in self-regulated individual study, and what factors influence this behavior?

RQ2: How much language skill improvement do learners anticipate (initial survey) and report (retrospective survey) by attending their Technical English course, and what factors influence this judgment?

RQ3: How satisfied are learners with their reported time investment in self-regulated individual study (retrospective survey), and what factors influence this reported level of academic satisfaction?

The learner's anticipated and reported time investment in self-led study (RQ1) is viewed as a lens into their ability to strategically self-regulate their language learning process. The self-led study behavior (RQ1) combined with their anticipated or reported language skill improvement (RQ2) is a window into the learner's cognitive, behavioral and motivational engagement with the language course material, or self-efficacy. Learners should be aware of the expectation for self-regulation, as the workload for self-led study is specifically stipulated in each module description as part of the standardized European Credit Transfer and Accumulation System (ECTS). The reflection on the learner's satisfaction with their investment in self-led study (RQ3) grants access to the individual's perceived self-efficacy for self-regulation; to what extent does the learner feel they were able to manage their learning process to promote their language learning achievement.

Method

Sample

The large-scale survey sample for this study was composed of undergraduate students pursuing engineering and technical degrees at two universities of applied sciences (UAS) in the Free State of Bavaria in southern Germany. The students were enrolled in a Technical English (TE) course at their respective UAS as a part of their curriculum. (There is some variation between degree programs, but typically a single semester of TE coursework is included in the core curriculum.) Data was collected in an initial survey at the beginning of the course and again in a retrospective survey directly before the course concluded at the end of the semester.

Due to a combination of fewer iterations as well as attrition over the course of the semester, there is a significant difference in the number of respondents in the initial survey ($N=1646$) and the number of respondents in the retrospective survey ($N=796$). The gathered information is anonymous and contains self-assessment of language competency as well as responses regarding expectations, language skill improvement, and satisfaction.

Instrument

Two predominant survey methodologies available to researchers attempting to gather meaningful data on groups of interest within a population are the questionnaire or the structured interview. Each of course is well-established and has inherent strengths and

weaknesses [21], but the questionnaire provides the advantage of being less time-intensive per respondent and more readily applicable to larger groups. Because of the relatively large number of potential participants available to provide data for this study, the survey questionnaire is the method of choice.

Student self-assessment as a whole remains a topic of legitimate contention [2], and there are numerous issues warranting closer inspection [35]. However, under proper conditions, self-assessment results can generally be deemed reliable, with the ability of responders to participate critically in the assessment process tracking with age [39], experience [36], and ability [13]. Overestimation has long been determined to be more likely when the learner's grade is linked to the result of the self-assessment [7]; this factor is moot in the present study, as neither participation nor the responses in the survey had any effect on the course evaluation. Self-assessment independent of course performance is therefore held to be more accurate since the survey participants incur neither penalty nor advantage based on how they respond and thus they have no extrinsic incentive to be anything other than objective with regard to their purported abilities.

The identity of the respondents is kept anonymous to maintain confidentiality and to not infringe on privacy. Anonymity can have a positive impact on respondents' attitude towards the survey when they trust their submitted information will not be misused [37]. Other research has shown the lack of accountability associated with complete anonymity potentially jeopardizes the validity of survey responses by fostering satisficing [26]. However, there is also evidence that topical clarity and cultural influences can effectively reduce the difference between anonymous and non-anonymous responses to insignificance [17].

A commercial, internet-based survey application was implemented because of the practicality it entailed, e.g., ease of formatting, ready availability in all facilities, automatic collection of data without requiring transcription, and immediate evaluation. Internet-based surveys are also known to induce respondents to accurately answer what are considered sensitive questions at a higher rate than traditional pencil-and-paper surveys [16]. The ubiquity of mobile phones and tablet computers facilitated the participation of essentially all course participants. The application behaved reliably and no notable technical difficulties were registered.

Design

A survey questionnaire was constructed to collect data from L2 undergraduate-level Technical English learners on the core elements of competence, progress, and satisfaction. Following established guidelines for L2 questionnaires [12], a combination of Likert scales, slider scales, multiple choice, and free-text responses was applied. Care was taken to provide an effective variety of question length, type, and focus. A survey duration of approximately 10 minutes was targeted, as that length of time has correlated positively to both high response rate and good data quality [37].

Two separate and complementary surveys were implemented in this study. At the commencement of each new semester, learners completed the initial survey in-class at the very beginning of the course, prior to being introduced to the curriculum. This made

it possible to ask questions regarding their abilities and expectations without unduly adulterating their responses with the instructor's goals and expectations. This first survey specifically requested their:

- self-assessment of English-language capabilities;
- personal expectations for the course; and
- intended time investment in the course (both inside and outside of class).

The second survey, the retrospective survey, was administered in-class near the end of the semester and prior to the course's final exam, again asked the learners to self-assess their language capabilities, and requested information on their:

- perceived improvement;
- satisfaction regarding the course; and
- actual time investment in the course (both inside and outside of class).

Self-assessment

To determine how the survey participants perceived their own English-language capabilities, both the initial and retrospective survey presented them with a selection of competency descriptions based on the self-assessment orientation tool of the Common European Framework of Reference for Languages (CEFR) [8]. The descriptions corresponding to the three competency levels B1, B2, and C1 (intermediate, upper intermediate, and advanced, respectively) were included for each of the four modalities: reading, speaking, listening, and writing. In further self-assessment questions included in the retrospective survey, intended to trigger elements of self-reflection, respondents were asked to determine whether their English had improved, and then to qualify on a slider scale the degree to which their English ability in each modality had been affected. In addition, free text questions were included to determine the aspects of the course they perceived had promoted their personal development most.

Expectations

The initial survey queried the respondents on a specific range of their expectations relating to the course. Besides listing the topics they anticipated in a Technical English course, they were asked about their expectations regarding the:

- time they would invest in the course;
- probability the course would improve their English; and
- degree of improvement due to participating in the course.

The retrospective survey focused on the reflective evaluation of the course, mirroring the questions in the initial survey for participants to report on their actual learning behavior during the course.

Results

This research is part of a longitudinal study at the participating UAS. The presented information was gathered in surveys over a period of eight semesters between October 2016 and January 2020. The data was collected online, downloaded, and analyzed using the software packages R and SPSS.

Initial Survey

The initial survey has been completed by 1646 UAS students to date. The average duration respondents spent between accessing and completing the survey was about 9 minutes. This is very close to the aforementioned ideal 10-minute survey. Survey fatigue and satisficing are not expected to have significant influence on a survey of this length and structure.

Self-assessment of Language Skills

The competency self-assessment results for L2 English of the four language modalities listening, reading, writing, and speaking, based on the descriptions derived from the CEFR ($N=1545$), are presented in Table 1. There is a distribution of competency levels for each modality, and there is an apparent tendency for respondents to rate their receptive skills (listening, reading) higher than their productive skills (writing, speaking). There is also a difference in the distributions for the receptive components, with more than twice as many respondents (33.1%) ranking their listening skills at the upper end of the spectrum compared to those ranking their reading skills (13.9%) in that range of competence.

Personal Expectations

Figure 1 presents the results to the question of what the respondents think the chances are their English skills will improve due to participation in course. The results show the vast majority of respondents form part of a normal distribution centered around 7 on a scale of 1 to 10. Slightly over 10% ($N=176$) feel there is a very high probability of their English improving and respond with a 10, while the largest single group of nearly 12%

Table 1 Results of initial survey language modality self-assessment based on CEFR competence descriptions, $N=1545$

Modality	CEFR level					
	B1		B2		C1	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Listening	277	17.9	756	48.9	511	33.1
Reading	287	18.6	1043	67.5	214	13.9
Writing	670	43.4	759	49.1	112	7.2
Speaking	661	42.8	727	47.1	150	9.7

Fig. 1 Initial survey respondents' ranking from "very low" (0) to "very high" (10) of their expectation of whether course participation will improve their English skills. $N=1613$, Mean=6.46, SD=2.18, Median=6.5

($N=188$) is the happy medium group at 5. From these results, the take-away appears to be that half the respondents feel there is at best a 6.5 out of 10 chance their English capabilities will improve through course participation.

The results for the degree of improvement respondents expect in their English skills ($N=1623$) indicate a mean value of 5.67, SD of 1.87, and a median of 5.5, such that the data presents an approximately normal distribution between the extremes "very low" (0) and "very high" (10). The overrepresented happy medium group throws off the curve a bit, and a far smaller group of optimists cluster at 10. The respondents appear to be signaling that on average they have the realistic expectation that participating in the course can lead to a medium improvement in their English language capabilities.

Finally, students reported on their anticipated learning habits. They were asked to select one of five descriptions which best reflected the amount of time per week they were expecting to invest in the Technical English course. For the survey respondents ($N=1646$), the anticipated time investment was:

- 1.8% ($N=29$), no time at all
- 15.7% ($N=259$), duration of the weekly lecture
- 44.9% ($N=739$), duration of the lecture plus an additional 30 minutes
- 28.1% ($N=463$), duration of the lecture plus an additional 60 minutes
- 9.3% ($N=153$), duration of the lecture plus more than an additional 60 minutes

The course module descriptions, which form the basis for the European Credit Transfer and Accumulation System (ECTS) accreditation for these Technical English courses, stipulate a self-led study time investment that is greater than the duration of the weekly lecture. For example, the module description of one of the associated courses stipulates the semester workload encompasses 24 hours of lectures, 12 hours of independent

revision, 14 hours of preparation of written assignments, and 10 hours of exam preparation; this sums up to an formal expectation of 24 hours of class time accompanied by 36 hours of self-led study. The expected self-study workload is unfortunately lost on nearly all learners, and this apparent mismatch is in itself a statement on motivation and language learning strategies.

Correlations Regarding Improvement Expectations

There is a moderately strong correlation (Table 2) between the expectation that English capabilities will improve by taking the course and the expected degree of improvement. Respondents further express the expectation that English capabilities will improve with the anticipated amount of time that will be dedicated to the course every week. In addition, this table shows the expected degree of improvement correlates with anticipated weekly time dedicated to the course as well. Taken together, there is a clear yet unsurprising expectation on behalf of the respondents that investing a greater amount of time with the material is linked to the likelihood that one's English will improve; and the more time is invested, the greater the improvement should be.

Correlations Regarding Self-Assessment

The anticipated time respondents expected to invest each week correlates negatively with their self-assessed language competency. Table 3 shows the negative correlation applies to all four language modalities. This observation reflects the circumstance that respondents who rate their capabilities higher conversely anticipate dedicating less time to the course and its material.

Retrospective Survey

The retrospective survey has been completed by 796 UAS students to date. The average duration respondents spent between accessing and completing the survey was about 8 minutes. The retrospective survey is somewhat streamlined compared to the initial survey and, for example, does not gather as much biographical data.

Table 2 Initial survey's Spearman's rho correlations between expectations regarding improvement and time invested in course

Expectations	r_s	Correlation			
		N	SE	Lower 95% CI	Upper 95% CI
English will improve & degree of improvement	0.588	1611	0.020	0.551	0.627
English will improve & time invested in course	0.203	1612	0.025	0.153	0.250
Degree of improvement & time invested in course	0.201	1622	0.026	0.145	0.250

$p < 0.01$ (2-tailed). Bootstrap based on 1000 samples

Table 3 Initial survey's Spearman's rho correlations between expected time investment and self-assessed competence ratings. The higher the competence rating, the lower the anticipated time commitment to the course

Modality	Expected time invested in course	
	r_s	N
Listening	-0.189	1440
Reading	-0.159	1440
Writing	-0.181	1437
Speaking	-0.151	1434

$p < 0.01$ (2-tailed). Bootstrap based on 1000 samples

Self-assessment

The competency self-assessment results for the retrospective survey are presented in Table 4 for the four language modalities listening, reading, writing, and speaking, based on the descriptions derived from the CEFR ($N=796$). The differences to the distributions from the initial survey are marked for easy recognition. All shifts in the distributions are nearly exclusively towards higher levels of competence compared to the initial survey's respondents.

The self-assessment results therefore are markedly different for the retrospective survey compared to the initial survey. There are now clear pluralities for the B2 levels in all four modalities and significant improvements in the share of respondents assessing themselves at C1. Although there is a general shift to higher competency rankings in the retrospective survey, there remains a notable distribution asymmetry between the productive skills and the receptive skills. There are between two and three times as many respondents who assess their receptive skills of reading or listening as C1 than those who assess their productive skills of speaking or writing at that level.

Table 4 Results of retrospective survey language modality self-assessment based on CEFR competence descriptions, $N=796$. Percentages that are higher than those for the initial survey are **bold and underlined**. Percentages that are lower than for the initial survey are in italics

Modality	CEFR level					
	B1		B2		C1	
	N	%	N	%	N	%
Listening	104	13.1	398	<u>50.0</u>	294	<u>36.9</u>
Reading	72	9.0	482	<u>60.6</u>	242	<u>30.4</u>
Writing	214	26.9	484	<u>60.8</u>	98	<u>12.3</u>
Speaking	214	26.9	472	<u>59.3</u>	108	<u>13.6</u>

Ratings and Satisfaction

In the retrospective survey, data was collected regarding the students' self-reported actual learning habits in the form of time invested in their Technical English coursework. In line with the initial survey, they were asked to select from five descriptors, which one best reflected the amount of time per week they had actually dedicated to the Technical English course. For the survey respondents ($N=796$), the estimated actual time investment was:

- 5.4% ($N=43$), no time at all;
- 26.8% ($N=213$), duration of the weekly lecture;
- 46.9% ($N=373$), duration of the lecture an additional 30 minutes;
- 16.1% ($N=128$), duration of the lecture plus an additional 60 minutes; and
- 4.9% ($N=39$), duration of the lecture plus more than an additional 60 minutes.

As in the initial survey, the plurality of respondents selected *duration of the lecture plus an additional 30 minutes*. However, the remaining percentages appear to have pivoted about the center. In the initial survey, 17.5% of respondents anticipated no self-led study for the course on their part (i.e., only the duration of the lecture or no time at all), while 37.4% anticipated spending the lecture duration and an additional 60 minutes or more. In contrast, the retrospective survey revealed that 32.2% reported they had invested no time self-led study, and 21.0% had spent the lecture duration and an additional 60 minutes or more on their Technical English coursework.

Figure 2 presents the results of the respondents to the retrospective survey ranking their satisfaction with the time they invested in the course relative to their perceived

Fig. 2 Retrospective survey respondents' satisfaction with the time they invested in the course relative to their perceived learning achievement, ranked from "I should have invested more time" (0) to "I invested too much time" (10). $N=747$, Mean=4.32, SD=1.80, Median=4.5

Table 5 Retrospective survey's Spearman's rho correlations between the respondents' perceived degree of improvement in the four language modalities. Perceived improvement in any modality corresponds to perceived improvement in the other three modalities. Data is abridged for clarity of presentation

Modality	Perceived degree of improvement		
	Reading impr.	Writing impr.	Speaking impr.
1. Listening impr.	0.486	0.329	0.440
2. Reading impr.		0.502	0.476
3. Writing impr.			0.436

$N=791$. $p<0.01$ (2-tailed). Bootstrap and SE results not included

learning achievement. The largest single group (23.2%, $N=185$) is located at the center of the x -axis, indicating that that subgroup of respondents feels relatively satisfied the amount of time they invested balances with their learning achievement. The distribution is noticeably asymmetric, with 57.2% ($N=382$) expressing in some form they feel their learning achievement could have been bolstered by spending more time learning for the course, while 18.1% ($N=135$) indicated they had invested too much time in the course relative to their perceived learning achievement.

Correlations Regarding Perceived Improvement

The perceived improvement in each of the four modalities correlates with that in each of the other three. Table 5 presents a condensed summary of those correlations. The data is abridged for clarity. In addition, the perceived levels of improvement correlate with strength in certain modalities, as seen in the abridged data in Table 6. In particular, those reporting skill strength in the receptive modalities listening and reading tend to be those reporting higher perceived learning achievement across all four skills.

Further analysis involving the perceived improvement ratings revealed additional correlations. Whether or not the respondents believed the course had improved their English correlated with their reported rate of class participation ($r_s=0.076$, $p<0.05$, two-tailed; $N=719$; 95% CI: 0.000, 0.144, SE=0.038). Those respondents who reported

Table 6 Retrospective survey's Spearman's rho correlations between the respondents' perceived degree of improvement (rows) and their self-assessed skill level (columns) in the four language modalities. Perceived improvement and perceived skill level go hand in hand. Data is abridged for clarity of presentation

Modality	Perceived skill level			
	Listening	Reading	Writing	Speaking
Listening impr.	0.118	0.080*		
Reading impr.	0.090*	0.095	0.107	
Writing impr.	0.179	0.201	0.227	0.117
Speaking impr.	0.183	0.183	0.165	0.211

$N=789$. $p<0.05$ (*) or $p<0.01$ (2-tailed). Bootstrap and SE results not included

Table 7 Retrospective survey's Spearman's rho correlations between the respondents' perceived rate of improvement in the four modalities and their reported rate of class participation (right half of table)

Modality	Class participation				
	r_s	N	SE	Lower 95% CI	Upper 95% CI
Listening impr.	0.092*	716	0.036	0.017	0.160
Reading impr.	0.094*	716	0.036	0.025	0.163
Writing impr.	0.092*	716	0.037	0.015	0.168
Speaking impr.	0.234	716	0.035	0.162	0.302

$p < 0.05$ (*) or $p < 0.01$ (2-tailed). Bootstrap based on 1000 samples

higher participation thus also tended to state the course had improved their English. Moreover, the perceived level of improvement in listening correlated ($r_s=0.075$, $p<0.05$, two-tailed; $N=790$; 95% CI: 0.005, 0.144, SE=0.036) with the rate of attendance. Respondents who came to class more tended to rate in particular their improvement in listening comprehension higher.

Table 7 displays the correlations for class participation and perceived level of improvement. All four modalities show a positive correlation, with the relationship being especially apparent for speaking. This reflects the course's focus on oral pair and group work during the lecture period.

The left half of Table 8 contains the correlations of the perceived levels of improvement with the weekly time invested in the course and self-led study. The slightly more conspicuous correlations for listening, reading, and writing correspond well with the observation made in the previous paragraph regarding the lecture period's focus on oral communication. In self-regulated study, the learners could focus on the skills other than speaking. The right half of Table 8 shows that satisfaction with the invested time with regard to learning achievement correlates only with the perceived improvement in speaking.

Table 8 Retrospective survey's Spearman's rho correlations between the respondents' perceived rate of improvement in the four modalities and reported time investment in the course (left half of table) as well as their satisfaction with the time they invested in the course relative to their perceived learning achievement (right half of table)

Modality	Time invested in course					Satisfaction with invested time w/r to learning achievement				
	r_s	N	SE	Lower 95% CI	Upper 95% CI	r_s	N	SE	Lower 95% CI	Upper 95% CI
Listening impr.	0.098	791	0.036	0.025	0.166	-	-	-	-	-
Reading impr.	0.170	791	0.037	0.096	0.244	-	-	-	-	-
Writing impr.	0.139	791	0.035	0.073	0.207	-	-	-	-	-
Speaking impr.	0.078*	791	0.037	0.003	0.146	0.122	744	0.038	0.050	0.199

$p < 0.05$ (*) or $p < 0.01$ (2-tailed). Bootstrap based on 1000 samples

Table 9 Retrospective survey's Spearman's rho correlations between the respondents' self-assessed competence ratings and reported degree of participation in class. Learners with stronger perceived skills tended to participate more, weaker learners less

Modality	Degree of participation during class				
	r_s	N	SE	Lower 95% CI	Upper 95% CI
Listening	0.129	719	0.38	0.053	0.200
Reading	0.177	719	0.38	0.096	0.250
Writing	0.152	719	0.37	0.082	0.222
Speaking	0.217	719	0.37	0.139	0.289

$p < 0.01$ (2-tailed). Bootstrap based on 1000 samples

Correlations Regarding Self-assessment

The correlations of self-assessed skill levels with perceived improvement were mentioned in the previous section (Tables 5 and 6). Unsurprisingly, each of the reported self-assessed skill levels also correlated with the other three. That is, respondents tended to rate their skill levels in the different modalities at comparable levels. These results deserve mention but are somewhat trivial and are not included.

The self-assessed speaking skill level correlated inversely ($r_s = -0.071$, $p < 0.05$, two-tailed; $N = 793$; 95% CI: -0.140 , -0.003 , $SE = 0.034$) with the reported class attendance. Respondents with strong self-assessed speaking skill tended to come to class less, while those with weaker skill tended to class more regularly.

Participation during class correlates with the skill levels, as presented in Table 9. Respondents with stronger skills reported participating in class more, while those with weaker skills participated less. This observation holds across all four modalities.

Correlations Regarding Satisfaction

Table 10 presents the correlations of the self-assessed skill levels and the satisfaction with invested time with regard to learning achievement. The results show the higher that respondents rated their skill level in each respective modality, the greater their level

Table 10 Retrospective survey's Spearman's rho correlations between the respondents' self-assessed competence ratings and reported degree of satisfaction with the time they invested relative to their learning achievement. Stronger learners tend to be more satisfied and weaker learners less

Modality	Satisfaction with invested time w/r to learning achievement				
	r_s	N	SE	Lower 95% CI	Upper 95% CI
Listening	0.114	745	0.36	0.045	0.185
Reading	0.169	745	0.36	0.102	0.242
Writing	0.165	745	0.38	0.089	0.241
Speaking	0.220	745	0.37	0.146	0.294

$p < 0.01$ (2-tailed). Bootstrap based on 1000 samples

of satisfaction tended to be with the time they invested in learning. Weaker learners, therefore, were more likely to have a lower level of satisfaction, regardless of the amount of time they invested.

Discussion

Initial Survey

The self-assessment responses for the initial survey reveal a tendency for respondents to rank their receptive skills as stronger than their productive skills (Table 1). Of the receptive skills, a larger percentage of respondents rate their listening skills higher level than their reading skills. The majority of learners are thus acknowledging there is potential for improvement in their English language skills, in particular in their writing and speaking.

These same respondents also indicate they generally expect that participating in the course will improve their English skills. This relationship is intriguing. In other words, the more likely a respondent expects the course will enhance their English, the greater they expect the extent of that improvement to be, and vice-versa. This relationship is reminiscent of the cyclical relationship between self-efficacy and the successful application of language learning strategies. Here, the perception that the TE course will be effective leads to an expectation for greater learning achievement.

This result is not completely surprising in light of the skills distribution (Table 1) showing over 40% of respondents at the low skill level (for these German respondents, low being CEFR B1). The question remains, of course, what students are willing to commit to improve their English. The fact that respondents also indicate they expect only an intermediate improvement in their English skills is already a potential indicator they do not plan to unleash their full learning potential. They are perhaps being realistic in their assessment based on experience and are aware that anything less than a full commitment cannot garner more than middling progress.

Nearly half of the initial respondents anticipated dedicating the duration of the lecture plus an additional 30 minutes to the course every week. Just slightly over a third projected spending beyond the additional 30 minutes. This is a bit of a trick question, and the results are disappointing. As described in the “[Results](#)” section, the course module description stipulates 90 minutes of self-led study for each 60 minutes of lectures. From the outset, learners appear inherently geared towards not applying the instructor’s expected effort to language learning. This makes an expectation of only intermediate improvement seem even more realistic.

Unsurprisingly, responses in the initial survey (Table 2) indicate a clear expectation that increased time investment in self-regulated study will not only increase the likelihood of improvement but also the degree of improvement is related to that same time investment. Learners therefore are making the connection between their commitment and their learning outcome.

A stronger correlation exists between the expectation the respondents’ English will improve and the expected degree of improvement. The more strongly respondents expect an improvement, the greater they expect that improvement to be. A contraindicative scenario, in which respondents emphatically expect their English to

improve but only by a little, are a minority. Possibly, this is an inversion of the skill level pyramid. Strong learners may have lower expectation to improve, if then only by a modest degree. Meanwhile, weaker learners seemingly are assured of learning something, and that new knowledge may be significant relative to their pre-course level.

The correlations with the self-assessment levels (Table 3) reveal that stronger learners intend to devote less time and weaker learners more time to self-regulated study. While this may indeed reflect elements of effort minimization, the results from the retrospective survey disclose that absolute time invested is not a direct indicator of learning achievement.

Retrospective Survey

Although they still reflect a disparity between the receptive and productive skills, the self-assessment results from the retrospective survey (Table 4) reveal notable differences to those from the initial survey (Table 1). The respondents' rankings for listening are close to interchangeable between the two surveys, but the other three modalities show considerable shifts to the higher skill levels. Reading in particular contains a much greater percentage of respondents at the C1 level at the end of the course.

The initial survey sample size ($N=1646$) is more than double that of the retrospective survey ($N=796$). Attrition is the primary cause for the decrease, i.e., students postponing the course, changing majors, and leaving the university. If weaker learners are more likely to drop the course, that could contribute to the shift towards higher self-ratings. It would, however, not necessarily explain why the listening results remain unaffected.

Perhaps the higher self-reported competence in three out of four modalities indicates a learning effect as well. It stands to reason that a considerable proportion of the respondents remaining at the end of the course will have regularly participated in class throughout the semester. Possibly, that has had the desired effect of stimulating their learning achievement (or perception thereof).

Comparing the initial and retrospective values of anticipated and reported time commitment shows not all intentions make it off the drawing table. The bulk of responses in both surveys indicated an investment of lecture duration plus an additional 30 minutes per week. However, the numbers show a far smaller percentage of learners than prognosticated actually invested in additional self-regulated study, and that nearly a third reported refraining from it completely. Setting a goal is inconsequential if no subsequent actualization of behavior to attain that goal takes place [18].

Learners were asked to rank their satisfaction with the time invested in the course relative to their perceived learning achievement. The results (Fig. 2) exhibit thought-provoking asymmetry. The overwhelming majority of respondents indicate that to some extent they believe their learning would have benefited from spending more time on the course material. In retrospect, the overwhelming sentiment among learners appears to be they should have studied more to better fulfill their learning potential. While educators may be disappointed that students report investing far less time on self-regulated study than foreseen, at least there is the small consolation that the learners also regret not studying more.

Turning now to skill development, respondents who reported the course had improved their English tended to report comparable improvement in all four modalities (Table 5), viz. the correlations are comparably strong. It is interesting to note there is no receptive/productive disparity as seen in the self-assessment results (Table 4). Respondents tend not to report that one modality flourished while another languished. This perhaps speaks for the ability of the coursework to address all modalities effectively enough that learners perceived equitable progress.

However, when factoring out the perceived skill improvement by reported skill level, the correlations reveal a disparity. Whereas the reported skill level in the receptive skills correlates with perceived improvement in all four modalities, the productive skill sets are restricted. Skill level in writing or speaking does not correlate with listening improvement, for example. A feasible explanation is that strong writers and speakers will already tend to be strong listeners and readers. They may therefore perceive less improvement in their receptive skills. Learners with weaker productive skills may simply have more room for improvement.

However, in general, students with a higher self-assessed skill level reported greater perceived improvement. This can be interpreted as a manifestation of the Matthew Effect [25], in which high performing students make disproportionately greater progress than low performing.

Respondents with a higher attendance rate tended to report greater improvement in listening. This can be related to the circumstance that a large part of the lecture time was spent listening to the instructor or to a partner during pair work. Especially given that students reported investing less time than anticipated in self-led study, they would also have lower exposure to spoken English outside of class, e.g., via listening exercises on the course Moodle. Similarly, speaking skill in particular appears to improve through class participation.

In contrast, listening, reading, and writing develop well through self-led study. Those learners devoting time to the course material outside of the lecture would spend that time primarily with listening, reading, and writing. It thus follows they would perceive improvement in those modalities in particular. These results are also noteworthy in that the dedication to self-study indicates higher self-efficacy for self-regulation and thereby better learning progress. The perceived improvement is thus consistent with recent work concluding that self-regulated learning plays a primary role in forecasting language performance [42]

The satisfaction with time invested with regard to learning achievement correlated only with a single perceived improvement, that for speaking (Table 8). Speaking is the only modality whose time window for learning was stipulated by the course structure, being limited to the duration of the lecture. The time spent on the remaining three modalities was modulated by each learner and thus subject to their self-regulated study behavior. Speaking is possibly the exception regarding learner satisfaction because students who practiced in class felt they had utilized all the time available for that respective modality.

Regarding the interplay between skills competence and participation, strong speakers tended to come to class less and devoted less time to self-led study. The latter also applies to strong readers. Reciprocally, that means weaker speakers tended to come to class more often and, along with weaker readers, devoted more time to the course. However, somewhat incongruously, stronger learners in all modalities tend to

participate more in class, while weaker students tend to participate less (Table 9). This reluctance among weaker studies is most likely an expression of lower willingness to communicate [28] due to their lower skill and knowledge levels and resulting inhibitions.

Higher satisfaction with invested time with regard to learning achievement tracked with skill level for all four modalities (Table 10). This again evokes the Matthew Effect [25]. The stronger the initial skills of a learner are, the likelier they are to experience learning achievement and thus be satisfied with that achievement. This also means weaker students are more likely to be dissatisfied with their learning achievement.

Discussion of Research Questions

The first research question seeks to understand learners' anticipated and reported time invested in self-led study, along with the factors influencing this behavior. Overwhelmingly, learners anticipate and report devoting less time to self-led study than that formally stipulated by the course module descriptions. Furthermore, the retrospective survey indicates that learners report investing even less time in self-led study than they anticipated at the beginning of the course. Given that the stipulation for more self-led study and the non-insignificant failure rate (e.g., one of the associated courses has a failure rate of 54% ($N=195$)), it seems unlikely that greater time investment in self-led study is unwarranted. (In contrast, if the course were too easy for the learners, then lower than anticipated time for self-led study would be a reasonable response. Indeed, higher proficiency students reported less time invested in self-led study; unfortunately, lower proficiency students also reported insufficient self-led study time.)

Rather, it seems that learners are misjudging the requisite study time or failing to adequately self-regulate their learning processes. The survey responses indicate that the learners are well aware that self-led study leads to language skill improvement, and that the more time invested, the greater the improvement should be. The selected instrument of a large-scale questionnaire survey is unable to reveal why learners are failing to adequately regulate their self-led study behavior, but observationally the two most significant factors would appear to be lack of motivation for language learning and competing priorities with other coursework, especially given that the respondents specialized in engineering and other technical disciplines.

The second research question deals with anticipated and reported language skill improvement to provide insight into learners' perceived self-efficacy. The initial survey found that learners with a pronounced expectation of skill improvement also expected the greatest degree of improvement, and indeed, the level of improvement among language skills was highly correlated. Higher proficiency students reported greater improvement to their language skills, indicating that they are likely to have developed better strategies for self-efficacy and self-regulation, in line with findings by other studies such as Hu and Gao [22]. As such, a concordance between the concept of academic self-efficacy and the observational power of the Matthew Effect in language learning [25] can be established.

Regarding the improvement of individual skills, attending class was reported to induce the strongest improvement to listening skills, while active participation in class led to greater improvement to speaking skills. Meanwhile, time invested in self-led study outside of class correlated more strongly with improvement in the skills of

reading, writing, and listening. These findings are fully plausible: exposure to the instructor and interaction with other students in class promote listening and speaking, while self-led study promotes skills that can be trained individually, namely reading, writing, and listening (e.g., on the course Moodle). Crucially, these findings reinforce that self-efficacy for self-regulation—here, by means of the discipline for regular course participation and time independently invested for self-led study outside of class—are significant factors for language skill improvement.

The third and final research question evaluated learners' satisfaction with the time invested in their language learning as a proxy for the individual's perceived self-efficacy for self-regulation. Higher performing learners were more satisfied with the amount of time they invested in class. It may be that these learners' optimal language learning strategies allow them to better assess the amount of time required for the coursework or to use this time more efficiently; alternatively, their advanced skill level may simply have allowed them to study less while still obtaining a positive course evaluation. Yet overall, respondents indicated that they should have invested more time in their language coursework. While this finding is disappointing to language instructors, it indicates that students are at least aware of the benefits of academic self-efficacy for self-regulation, even when the individual is unable to successfully manage his or her language learning strategies.

Implications for Practice

The significance of these results for L2 Technical English and English teaching in general are manifold. Individualities precipitate divergent learning achievement and disparate satisfaction even among learners enrolled in the exact same course. A dominant factor is learners' initial skill level. Stronger learners demonstrate greater academic self-efficacy and can incorporate new knowledge more adroitly; weaker learners exposed to identical opportunities will tend to make less progress.

The learner's disposition towards self-regulated learning is a further prevalent factor. The data not only establishes that learners expect increased self-regulated learning can yield greater learning achievement; the retrospective survey confirms respondents reporting higher time investment also perceived greater improvement and vice versa. Satisfaction is tied to the same self-regulated learning factor, with most learners acknowledging their learning achievement would have profited from further studying. Given the recognized importance of self-regulated study, instructors should apply resources to help learners develop adequate techniques for independent revision outside of class.

Research into self-efficacy and self-regulation in language learning has found that high performing students actively or more skillfully apply a broader range of sociocultural (meta-)strategies than weaker students (e.g., [1, 22]). This strategic skills gap can also help explain why stronger students reported greater progress through self-regulated learning. Indeed, these learners also report greater satisfaction with their self-regulated learning, further indicating that they have accurately surmised that their strategies and processes are more effective. To help lower performing students develop the strategic skills to raise the efficacy of self-regulated learning, the explicit instruction of successful strategies and scaffolding of the learning process are recommended [3, 9], although this tactic would presumably only reduce but not eliminate the strategic skills gap between higher and lower

performing students. A promising new perspective links self-efficacy with Dweck's concept of a growth mindset [14] to understand differences in individual learners' language development [4].

The language learners in the survey samples embody the typical heterogeneity encountered in the university classroom, produced by the culmination of individual differences in several key areas addressed in the results. For the development of an effective L2 Technical English course for such a diverse body, the aspects revealed by the survey data need to be addressed. Sufficient material for self-led learning must be readily available to learners, and methods encouraging effective engagement with these materials applied. In the classroom, strategies for activating learners of all skill levels are called for.

Undeniably, weaker learners will need to devote more resources to register gains comparable to those of stronger course mates. Consciously strengthening the factors correlating with higher perceived learning achievement, emphasizing and supporting self-led learning, and cultivating a culture of high class participation will provide all learners with an environment conducive to them attaining enhanced self-efficacy for self-regulation, leading to higher levels of progress as well as greater personal satisfaction.

Conclusion

The two administered surveys provide a wealth of data, allowing a systematic study into L2 Technical English learners' motivations and learning strategies. The potential learning achievement of individual language course participants is invariably linked to factors such as initial competence, academic self-efficacy, and self-regulation, which were investigated here by proxy through the reported factors of time invested in independent self-led study, language skill improvement, and the learner's satisfaction with their individual strategic learning behaviors.

The findings in this large-scale survey give broad insight into the reported self-regulatory behavior of a large number of tertiary-level language learners. This study is unique not only in scope and scale but also provides the important insight that learners rightly perceive a relationship between academic self-efficacy and language learning achievement, yet even as young adults language learners assess the development of the their own academic self-regulation as below expectations. Nonetheless, as a purely quantitative study, it provides rather limited understanding of individual learners' specific motivations or nuanced learning practices. Ideally, this study can be triangulated with qualitative elements such as focus group interviews or reflective journals to provide greater insight.

Self-efficacy and self-regulated study reliably lead to perceived enhancement of language skills in reading, writing, and listening among study participants. Learners understand that improvement hinges upon personal commitment and are likely to attribute dissatisfaction with their perceived improvement to personal neglect of self-regulated study outside of class. Regrettably, undeterred by this universally recognized hindsight, a majority of learners appears to gravitate towards a strategy of minimized effort associated with mediocrity and underachievement rather than fulfillment of true potential. To this end, the motivation of learners based on their individual biographies and skillsets is essential to promote learning.

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