

Is It Time to Consider Science High School-Specific English? A Quantitative Case Study

Muhammet Yaşar Yüzlü^{a*}

a Assoc. Prof. Dr., Zonguldak Bülent Ecevit University, <https://orcid.org/0000-0002-5377-7329> *muhammety.yuzlu@beun.edu.tr

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Abstract

The unique nature of each context has been recognized in applied linguistics to particularly address the specific needs of learners. This research aims to elucidate the specific requisites pertaining to English language skills within the cohort of science high school students. This quantitative study consists of 156 English as a foreign language (EFL) students studying in science high schools. The assembly of this study cohort was accomplished through criterion sampling. Data were gathered through a 28-item Likert-type questionnaire. Data analysis was conducted employing descriptive statistical methods. The study results reveal that the majority of students at science high schools desire to hone their speaking and reading skills to facilitate day-to-day interactions. However, a distinctive inclination surfaces in favour of scholarly and professional linguistic domains for the purpose of listening and writing. The findings underscore a compelling need for science high school students to cultivate autonomy in their pursuit of EFL mastery and engaging in collaborative endeavours with their peers. In light of the findings, the thoughtful restructuring of English language materials and activities is recommended. This restructuring should also be underpinned by a deliberate incorporation of the distinct requirements unique to science high school students. Pedagogical implications are discussed accordingly.

Keywords: English language teaching, case study, genre theory, science high school students.

Fen Liselerine Özgü İngilizce Eğitimini Düşünmenin Zamanı Geldi Mi? Nicel Vaka İncelemesi Öz

Uygulamalı dilbilimde, öğrencilerin özgün ihtiyaçlarını karşılamak için her bağlamın benzersiz bir doğası olduğu kabul edilmektedir. Bu araştırma, fen lisesi öğrencilerinin İngiliz dili becerileri ile ilgili özel gereksinimleri tespit etmeyi amaçlamaktadır. Bu nicel çalışma, fen liselerinde öğrenim gören 156 yabancı dil öğrencisini içermektedir. Çalışma grubunun oluşturulmasında ölçüt örnekleme yöntemi uygulanmıştır. Veriler, 28 maddelik Likert tipi anket aracılığıyla toplanmıştır. Veri setinin analizi, betimsel istatistiksel yöntemler kullanılarak gerçekleştirilmiştir. Çalışma sonuçları, fen liselerindeki çoğu öğrencinin günlük etkileşimleri kolaylaştırmak amacıyla konuşma ve okuma becerilerini geliştirmek istediğini ortaya koymaktadır. Ancak, dinleme ve yazma konularında özellikle akademik ve profesyonel dil alanları lehine belirgin bir eğilim ortaya çıkmaktadır. Bulgular, fen lisesi öğrencilerinin İngilizce dil becerilerine hakimiyet konusunda özerkliklerini geliştirmeleri gerekliliğini vurgulamaktadır ve bu süreçte akranlarıyla iş birliği yapmalarını önermektedir. Bulgular ışığında, İngilizce materyallerinin ve etkinliklerinin yeniden yapılandırılması önerilmektedir. Bu yeniden yapılandırma, fen lisesi öğrencilerine özgü belirgin gereksinimlerin dikkate alınmasıyla yürütülmelidir. Pedagojik çıkarımlar ayrıca tartışılmıştır.

Anahtar kelimeler: İngiliz dili eğitimi, vaka incelemesi, tür kuramı, fen lisesi öğrencileri.

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INTRODUCTION

Program assessment is predominantly undertaken to ascertain the extent to which the requisites of students are fulfilled (Alderson & Alan, 1992; Richards, 2002). Within this evaluative framework, Rossi et al. (2004) additionally emphasize that the commencement of this evaluative procedure is founded upon the imperative groundwork of needs analysis, as illustrated by Brown (1995) in Figure 1 below.

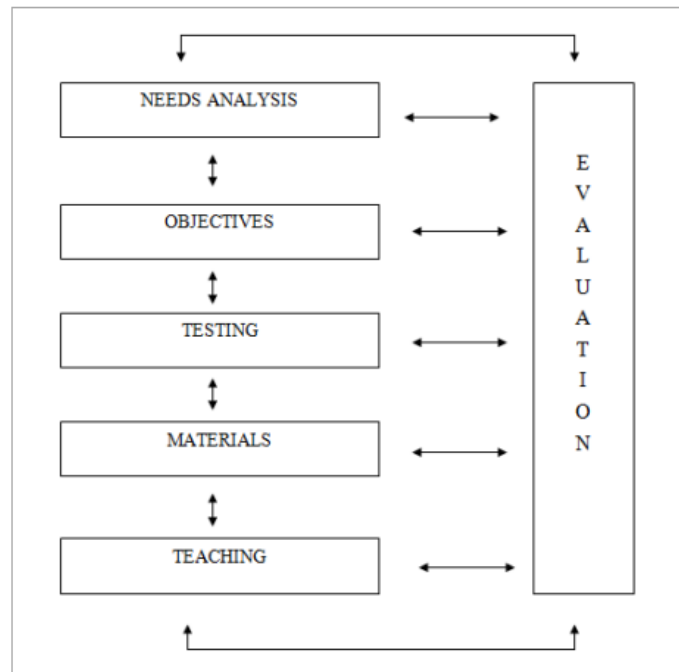


Figure 1. *Language curriculum development* (Brown, 1995, p. 20).

Needs analysis (NA) has garnered significant attention since its inception in the 1960s, ushering in the realm of English for Specific Purposes (ESP) while concurrently bolstering interest in program evaluation (Richards, 2001). Aligned with ESP, which is delineated as "an approach to language teaching which aims to meet the needs of particular learners" (Hutchinson & Waters, 1987, p. 21), NA has more recently been employed to craft curricula that prioritise the exigencies of students (Elisha-Primo et al., 2010). Given the inherent and intricate interconnection between NA and ESP, as elucidated by the provided definition, it becomes imperative to re-evaluate prevailing programs to adeptly address the evolving and situational needs of students (Jackson, 2005).

Positioned as a pivotal constituent within English language teaching programs, as evidenced by this study, NA functions as a unifying link among stakeholders encompassing students, parents, educators, and curriculum architects. While extant scholarly endeavours have centred on instructional staff (Arslan & Coskun, 2014; Durmuşoğlu Köse et al., 2019) and tertiary-level students (Yılmaz, 2009), scant attention has been devoted to high school milieus (Demir-Ayaz, Ozkardas, & Ozturan, 2019; İlgör, 2019). To the best of my knowledge, the research landscape remains void of any exploration into English language requisites for students enrolled in science high schools in Türkiye, colloquially labelled as "project schools," reserved for exceptionally accomplished students selected through a nationwide examination.

To address this hiatus, the present study targets to unearth the specific English language proficiency needs of students within science high schools, thereby elucidating the current state and fostering heightened cognizance thereof. In this pursuit, an additional aim lies in contributing to Türkiye's national curriculum guidelines by affording a glimpse into students' experiential realm, considering that the overarching English curriculum mirrors the pedagogical convictions, attitudes, and perceptions held by educators and policy-makers. Hence, this inquiry embarks on an odyssey to infuse English language pedagogy within the K-12 setting with a student-centric facet, concurrently enriching the discourse on English language instruction within science high schools by aligning it more comprehensively with the stipulated English language proficiency needs of the learners.

Needs Analysis, Curriculum, and Teaching Programme

In the intricate tapestry of foreign language curricula, NA occupies a paramount and anticipatory position, serving as the bedrock upon which curricular frameworks and teaching programs are constructed. Notwithstanding the interconnectedness that binds a teaching program and a curriculum, the curriculum serves as a broader term encompassing the scope of "what schools teach" (Eisner, 2002, p. 25), drawing from a mosaic of philosophical, societal, and administrative deliberations. In contrast, a teaching program pertains to the specific content embedded within the curriculum, directing its focus toward delineating the *what*, *how*, and *assessment* protocols for learning endeavours (Hutchinson & Waters, 1987; Yalden, 1987). Lynch (1997) similarly defines a teaching program as "a progression of interconnected courses aimed at achieving a shared objective or final product" (p. 2). Consequently, NA assumes the role of a pivotal juncture, guiding the practical implementation of content and the evaluation of learning outcomes at the level of a teaching program. Concurrently, NA extends its influence to the broader philosophical contours of a curriculum, sculpting the assortment of content, activities, and assessment modalities, thus exercising a profound sway over the philosophical determinations underpinning the curriculum and its constituent components.

Within this framework, the appraisal of curricula, a fundamental exercise aimed at upholding educational excellence (Ball, 2011; Cook, 2010), has been undertaken on both national scales (Özüdoğru, 2018; Süer, 2022) and on the global stage (Mappiasse & Sihes, 2014; Rolstad, Mahoney, & Glass, 2005; Seedhouse, 1995; Smith, Jung, & Zenker, 2022). These evaluations seek to ascertain the congruence between foreign language education provisions and the idiosyncratic interests and requirements of learners, while also considering technological advancements, fluctuations, and advancements (Flowerdew, 2013; Kali & Linn, 2010). In a parallel vein, an array of inquiries has been undertaken focusing on program evaluation grounded in the imperatives of students (Ahmetović & Dubravac, 2021; Padmadewi et al., 2022). Furthermore, a body of research addresses the evaluation of student perceptions (Karim et al., 2019), reminiscent of the approach articulated by Wood (2001). Wood's work serves as an illustrative instance wherein she assessed the Adult Education program at the University of Prince Edward Island, scrutinizing the degree to which the program met the requisites of adult educators. Employing a blend of comprehensive interviews, structured questionnaires, and thorough document reviews, data collection was geared towards both historical and present-day student perspectives concerning the program. The outcomes underscored the program's efficacy in satisfying numerous needs such as knowledge acquisition, skill enhancement, and professional regard, thus underscoring its efficacy in addressing the identified requirements.

In the Turkish context, comprehensive evaluation studies have been conducted concerning English Language Teaching programs across various educational levels. Research has been conducted at primary schools (Büyükduman, 2001, 2005; Isık, 2019; Kandemir & Tok, 2017; Koc, 2016; Kırkgöz, 2008; Mersinligil, 2002; Solak & Semerci, 2015; Topkaya & Küçük, 2010), secondary schools (Yanık, 2007), high schools (Avcı & Engin-Demir, 2021; Demir-Ayaz, Ozkardas, & Ozturan, 2019; Duran Güler, 2021; İlğör, 2019; Sabuncuoğlu, 2010), and tertiary institutions (Erdoğan & Mede, 2021; Gerede, 2005). Furthermore, within university contexts, studies have not only focused on NA (Gerede, 2005; Soruc, 2012; Ulum, 2015, 2020; Yılmaz, 2009) but have also delved into students' introspections (Demir, 2015). To illustrate, Tunc (2010) took an evaluative stance toward the efficacy of Ankara University Preparatory School's program, gleaning insights from both instructors and students. This investigation harnessed the CIPP (Context, Input, Process, and Product) evaluation model pioneered by Stufflebeam (1971). Notably, the findings underscored the necessity for enhancements in physical infrastructure, content delivery, educational materials, and assessment aspects of the program. Likewise, Erdoğan and Mede (2021) embarked on an inquiry into university students' perceptions of an English preparatory program utilizing the CIPP model, revealing an aspiration among students to bolster their speaking and listening competencies, even as they expressed satisfaction with the prevailing teaching methodologies and materials. Shifting the focus to the K-12 landscape, evaluation studies predominantly concentrated on the impacts of three significant curriculum alterations introduced by the Turkish Ministry of National Education (TMoNE) in 2006 (Karcı, 2012), 2013 (Yaşar, 2015), and 2018 (Çimen, 2022). Amidst these evaluations, investigations concerning primary school English language teaching programs emphasize concerns regarding content and material inadequacy and inefficiency (Erarslan, 2018). However, the literature also indicates theoretical satisfaction among teachers with these programs. For instance, Büyükduman (2005) uncovered teachers' overall satisfaction with the program, albeit accompanied by challenges stemming from crowded classrooms and resource limitations. Such observations echo findings from earlier research (Mersinligil, 2002; Yüksel, 2001), with Mersinligil (2002) further spotlighting content-related burdens faced by both educators and students.

In a manner akin to the aforementioned primary school investigations, research at the high school level has revealed persistent challenges. For instance, Topkaya and Küçük (2010) scrutinized the English language teaching program for fourth and fifth graders, analysing teachers' perspectives on its general attributes, objectives, and content. Their findings illuminated a moderately positive consensus among teachers regarding these aspects. Similarly, Kandemir and Tok (2017) adopted a participant-oriented program evaluation approach to assess the second-grade English curriculum. Despite recognizing the program's overall applicability, the teachers called for adjustments in course duration, class sizes, seating arrangements, and the selection of textbooks, in addition to advocating for activities that engage students. Taking a parallel course, research in high school contexts has echoed recurring concerns, such as constrained class hours, overcrowded classrooms, and inadequacies in course materials (Demir-Ayaz, Ozkardas, & Ozturan, 2019). Beyond these logistical and administrative hurdles, the prominence of demands related to language skills, particularly speaking proficiency, has emerged (İlgör, 2019). This accentuates an existing trend wherein instruction, often dominated by grammar and textbooks, disproportionately emphasizes written skills at the expense of oracy competencies like listening and speaking (Özen et al., 2013).

While recent studies have directed their attention towards teachers and students in vocational and technical Anatolian high schools (Avcı & Engin-Demir, 2021; Duran Güler, 2021; İlgör, 2019), limited research has encompassed students and educators within science high schools. For instance, Demir-Ayaz, Ozkardas, and Ozturan (2019) probed the intricacies of English language education in Turkish high schools, including students from science high schools. Notably, they underscored the prevalent need for cultivating speaking skills. Furthermore, contemporary studies have underscored students' inclination towards cooperative learning (Koç, 2018) and their aspiration for self-directed learning (Yüzlü & Arslan, 2017; Yüzlü, 2023). However, a significant research gap remains in probing the specific English language skill requirements of students enrolled in science high schools. Thus, this study seeks to address this void, aiming to provide insights that align with the objectives of the TMoNE, which endeavours to formulate English curricula tailored to distinct school types (MEB, 2018).

Genre Theory

Representing a pivotal departure in pedagogical approaches (Hyland, 2004), Johns (2002) contends that genre constitutes one of the most pivotal and influential concepts within language education. Genre theory fundamentally challenges limited behavioural and psycholinguistic interpretations of language and language teaching (Barton, Hamilton, & Ivanic, 2000). Instead, it draws upon the sociocultural theories of Bakhtin, Halliday, and Vygotsky, embracing conceptions of language and learning that are deeply entrenched in social contexts (Byrnes, 2006). This theory accentuates the interplay between individual cognitive structures and broader macro-level ideologies, thereby acknowledging the interrelation of informal and formal educational paradigms (Gebhard, 2005; Janks, 2010).

With these epistemological underpinnings, Swales (2004) posits that genre analysis should commence from a social context, accounting for the institutional setting, social relationships of texts, and the broader social practices within which they are enmeshed. This perspective intersects with ESP (Hyland, 2004), encapsulating notions of needs-based, pragmatic, efficient, cost-effective, and functional language usage (Hutchinson & Waters, 1987). In the realm of genre studies, genre is increasingly regarded as dynamic and contextually bound, a departure from the once static and monolithic view, emphasizing the reciprocal influence between genre and individuals (Bhatia, 2004).

This nuanced understanding of genre (Swales, 1990) contrasts starkly with decontextualized views of language use, offering a more comprehensive view of the world. This understanding has paved the way for genre-based pedagogy as a powerful tool in foreign language instruction (Belcher, 2006). In tandem, genre theory aligns with ESP in dissecting and instructing spoken and written language within foreign language contexts (Weissberg, 1993), considering "structure, style, content, and intended audience" (Swales, 1990, p. 58). In doing so, it rejects broad and contextually unsound generalizations (Pennycook, 1997), opting for a stakeholder-sensitive approach that accommodates individual student needs. This is where NA comes into play, investigating the specific type of English that learners require (Widodo, 2017), with a particular emphasis on situational context (Anthony, 2018; Brown, 2016). Given the potential discrepancy between students' needs, teacher beliefs, and curricula, it is worth noting the importance of pinpointing students' English language skill-related needs using Balint's (2004) questionnaire.

Guided by this theoretical framework, this study aims to uncover the English language skill needs of students enrolled in science high schools, a gap that, to the best of my knowledge, has not been adequately addressed. This investigation aspires to provide insight into the needs of high-achieving students in science high

schools, who are admitted based on a nationwide examination. This study's significance lies in its quest to answer the following research question:

What are the English language needs of science high school students in Türkiye?

METHOD

Research Design

In strict adherence to the principles of research and publication ethics, this study was undertaken subsequent to obtaining ethical approval from the Ethics Committee of Zonguldak Bülent Ecevit University, as verified on December 29, 2022 (Approval Number: 250467). This study adopts a quantitative case study design which is defined as “an empirical inquiry that investigates a contemporary phenomenon (the ‘case’) in depth and within its real-world context” (Yin, 2014, p.16). In this study, the purpose is to understand the English language needs of students at science high schools in Zonguldak. To achieve this, “case study research has a functional and legitimate role in doing evaluations” (Yin, 2014, p. 219), thus enabling to capture the complexity of a case and exploring contextual conditions. In this regard, this design aligns with the study's objective of investigating the English language learning requirements of students enrolled in science high schools in Zonguldak. In line with this design, an online survey is an advantageous tool to focus on students’ views, experiences, or practices due to its openness, flexibility, wide-angle lens, affordability, and accessibility (Braun et al., 2021). The principal emphasis here is not on causality elucidation via experimental manipulations, but rather on gleaned insights from a specific population - namely, the science high school students in Zonguldak.

Given this orientation, the research does not aim to establish strict cause-and-effect relationships, but rather strives to outline prevailing trends within the data. In this regard, the study's characteristics align with the attributes of case study design (Creswell, 2015). Consequently, the employment of this design is particularly fitting, as it serves to discern individuals’ opinions, attitudes, and beliefs concerning a specific subject matter. In the present context, this approach serves as a robust mechanism to uncover the English language skill needs of science high school students, underscoring the alignment of this research with the focus of quantitative case study (Yin, 2014) through which researchers might collect closed-ended quantitative data by surveying a large number of individuals to obtain their specific views and their voices about the topic. This proves advantageous to help researchers answer descriptive questions (Creswell & Creswell, 2017).

Participants

The questionnaire was systematically administered to a sample of 156 students in their eleventh grade, enrolled in science high schools within Zonguldak, Türkiye. The selected participants fall within the age bracket of 16 to 17 years. The sampling process drew from a dual approach, combining convenience based on geographical proximity and availability, as well as purposive sampling strategies. By employing the convenience-based criterion, proximity and accessibility considerations were factored in to enhance participation. Simultaneously, the purposive sampling technique was invoked to specifically encompass eleventh-grade students. This selection rationale is rooted in my observation that eleventh graders possess a greater exposure to English learning, coupled with familiarity with the English curriculum within science high schools, distinguishing them from ninth and tenth graders. Furthermore, these students demonstrate a heightened commitment to enhancing their English language proficiency, relative to twelfth graders who are primarily preoccupied with university entrance examinations. This combined approach ensures a comprehensive and pertinent representation of the population of interest, while aligning with the methodological guidance provided by Ivankova, Creswell, and Plano Clark (2007).

Data collection and Analysis

The researcher employed a six-point Likert-type questionnaire devised by Balint (2004) to capture the English language needs of Turkish students enrolled in science high schools. This instrument is specifically tailored to discern the students' desired areas of development within English language learning. The questionnaire encompasses an evaluation of both present and future needs concerning language acquisition.

The initial item pertains to the four core language skills - reading, listening, speaking, and writing - and prompts participants to indicate the skill they aspire to enhance the most. The subsequent question tackles vocabulary knowledge, while the third item delves into the participants' valuation of grammar. Items four through nine are tailored to gauge preferences within reading skills, aimed at identifying specific areas for their application. The subsequent five items (items 10 to 14) are oriented toward pinpointing favoured contexts for practicing listening skills. For speaking skills, items 15 through 21 capture a range of aspects. Similarly, items 22 to 26 concentrate on discerning the purposes for which students intend to leverage their writing skills. Item 27 pertains

to the desire for autonomy, while item 28 explores the aspiration to enhance cooperation skills. The Likert-type questionnaire responses are structured across six degrees of importance, ranging from 6 (very important) to 1 (not at all important). Utilizing established cut-off thresholds in the literature (Öz, 2015), mean scores were classified into four distinct ranges: highly needed (4.50-6.00), moderately needed (3.00-4.49), slightly not needed (1.50-2.99), and unneeded (0-1.49).

To ensure the effectiveness of the instrument, a pilot study involving 35 representative students was initially conducted. The analysis yielded a coefficient alpha of .93, which affirms the robustness of the instrument for the study's objectives. The main data collection phase was executed by distributing the questionnaire through Google Forms via WhatsApp to facilitate students' convenience. Subsequently, the data collected from science high schools in Zonguldak, a province in Türkiye, at the outset of the spring term of the academic year 2022-2023, were imported into SPSS. Descriptive statistical techniques, encompassing mean scores, standard deviations, frequencies, and percentages, were employed to provide a concise representation of the numerical data, facilitating meaningful interpretation. This descriptive analysis enabled the researcher to draw conclusions in alignment with the research question, following the guidance of Cohen et al. (2000).

Procedure

In alignment with the research objective, the original questionnaire developed by Balint (2004), encompassing 28 items to evaluate both current and anticipated language learning needs, were translated into Turkish (see Appendix A for the questionnaire) to facilitate the respondents' understanding and comfort during the completion process. To ensure the instrument's validity, a process of back-translation was employed, involving two independent interpreters, both of whom are language experts having ten years of experience in translating English texts into Turkish and vice versa. This approach aimed to minimize the potential for measurement error. To ensure the instrument's reliability, a preliminary pilot study involving 35 representative students was conducted. The internal consistency was evaluated, yielding a coefficient alpha of .93, indicative of a robust index for the intended purpose. Cronbach's Alpha value of the questionnaire was calculated as .92 after the main study. The choice of conducting the study within Zonguldak was driven by considerations of geographical proximity and accessibility. This approach aligned with the principle of convenience sampling (Ivankova, Creswell, & Plano Clark, 2007). Furthermore, the decision to focus on eleventh graders stemmed from their relatively higher English learning experience and familiarity with the English curriculum within science high schools, in comparison to ninth and tenth graders. Importantly, they are not burdened by the university entrance examination pressures faced by twelfth graders. This purposive sampling rationale (Ivankova, Creswell, & Plano Clark, 2007) aimed to ensure a targeted representation of participants best suited for the study's goal. Prior to data collection, informed consent was obtained from both the students and their parents. The participants were then provided with a Google Document containing the questionnaire. Upon their completion, the collected data underwent the aforementioned analysis process.

FINDINGS

The outcomes of the questionnaire are outlined below. The interpretation begins with the initial three questions, presenting data in terms of percentages and frequencies. Subsequently, the ensuing questions are segmented in accordance with four distinct language skills - reading, listening, speaking, and writing - alongside autonomy and cooperation. Within each category, mean scores and their corresponding standard deviations are detailed. A visual representation of the findings about the first item in the questionnaire is captured in Figure 2, which elucidates the language skill(s) that science high school students are aspiring to enhance.



Figure 2. *The most useful skill to learn and practise to improve English from students' point of view.*

The presented figure distinctly illustrates that a significant majority of science high school students (62.8%) express a keen interest in enhancing their speaking skills. A notable proportion of students (17.3%) intend to prioritise the improvement of their listening abilities. This collective perspective underscores a substantial emphasis on oracy skills, with an aggregate of 80.2% of students indicating a preference for refining their speaking and listening proficiencies. In contrast, a relatively smaller segment (19.9%) of these students aims to augment their literacy capabilities, encompassing reading and writing competencies. Figure 3, presented below, elucidates the degree of significance that science high school students assign to the development of vocabulary skills in the realm of English language learning.

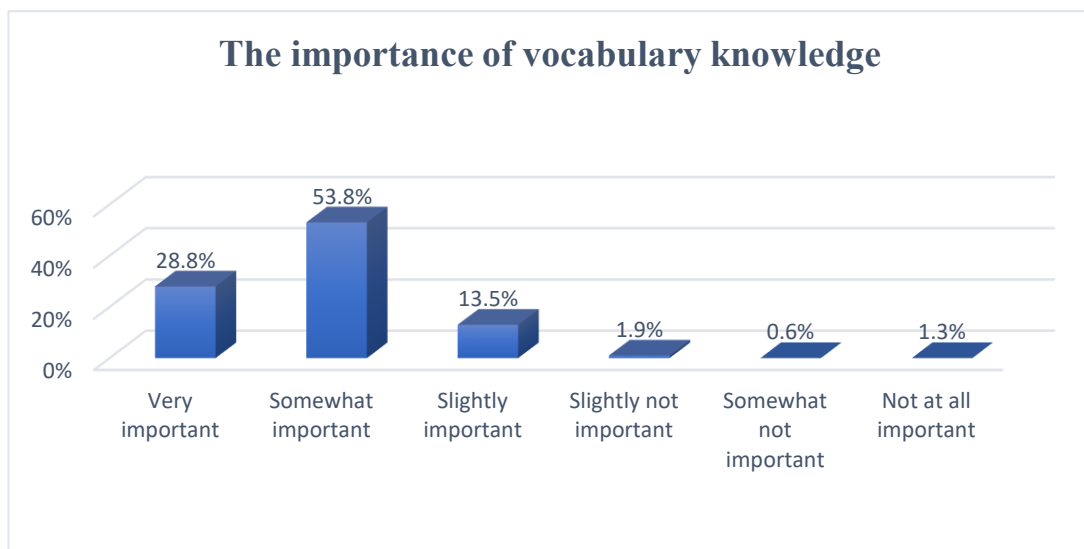


Figure 3. *The importance of vocabulary practice from students' point of view.*

The observations derived from the data reveal a compelling trend among science high school students. A substantial majority (96.2%) demonstrate a pronounced inclination towards recognizing the significance of vocabulary enhancement in the context of English language acquisition. This is manifested across a spectrum of responses, ranging from very important to slightly important. In stark contrast, a minor fraction (3.8%) of students perceive vocabulary knowledge practice as unimportant. Figure 4 explores the perceptions of science high school students regarding the relevance of grammatical knowledge in their pursuit of enhancing English language proficiency.

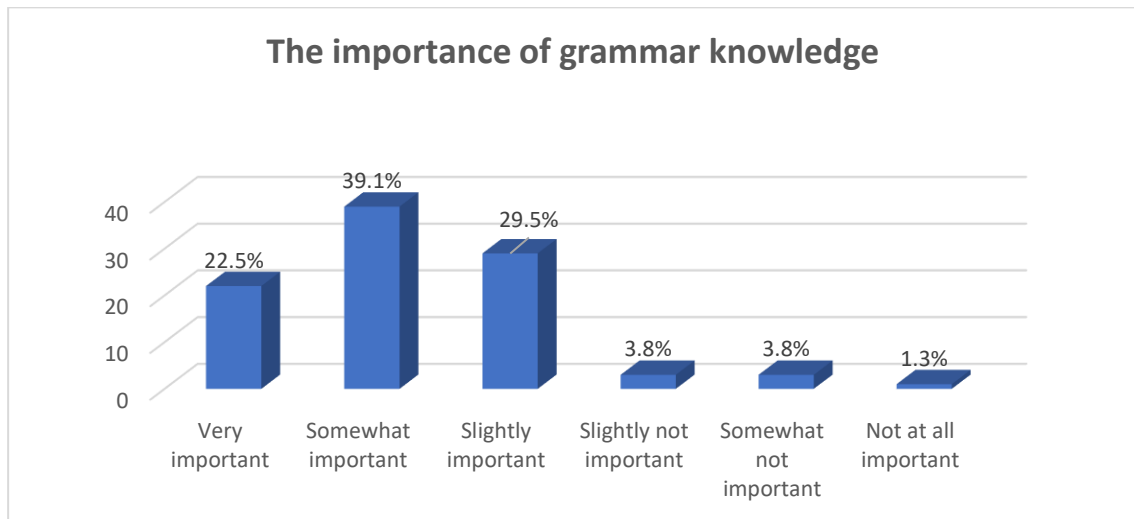


Figure 4. *The importance of grammar knowledge from students' point of view.*

Echoing the pattern observed in vocabulary knowledge, a similar trend emerges concerning the recognition of grammar knowledge among science high school students. An overwhelming majority (91.1%) of these students collectively acknowledge the significance of grammar expertise within English language learning. This acknowledgement is evident across varying degrees of importance, accompanied by an expressed aspiration to enhance this aspect. Conversely, a minority fraction (8.9%) of students hold the view that grammatical knowledge has lesser importance in their language learning journey.

Table 1. Frequency and percentage of the items between 2 and 28

Questionnaire Items	Very Important		Somewhat Important		Slightly Important		Slightly not Important		Somewhat not Important		Not at all important	
	N	%	N	%	N	%	N	%	N	%	N	%
2 -Vocabulary	45	28.8	84	53.8	21	13.5	3	1.9	1	0.6	2	1.3
3- Grammar	35	22.5	61	39.1	46	29.5	6	3.8	6	3.8	2	1.3
4-Reading	21	13.3	63	39.9	50	31.6	11	7	5	3.2	6	3.8
5-Reading	36	22.8	77	48.7	30	19	5	3.2	3	1.9	5	3.2
6-Reading	45	28.5	68	43	29	18.4	6	3.8	2	1.3	6	3.8
7-Reading	27	17.1	61	38.6	51	32.3	6	3.8	4	2.5	7	4.4
8-Reading	55	34.8	69	43.7	23	14.6	3	1.9	3	1.9	3	1.9
9-Reading	15	9.5	42	26.6	54	34.2	15	9.5	16	10.1	14	8.9
10-Listening	74	46.8	55	34.8	10	6.3	8	5.1	5	3.2	4	2.5
11-Listening	84	53.2	59	37.3	8	5.1	4	2.5	0	0	1	0.6
12-Listening	96	60.8	51	32.3	5	3.2	3	1.9	0	0	1	0.6
13-Listening	93	58.9	50	31.6	10	6.3	1	0.6	1	0.6	1	0.6
14-Listening	74	46.8	52	32.9	21	13.3	5	3.2	2	1.3	2	1.3
15-Speaking	95	60.1	49	31	9	5.7	1	0.6	0	0	2	1.3
16-Speaking	78	49.4	55	34.8	15	9.5	4	2.5	1	0.6	3	1.9
17-Speaking	76	48.1	65	41.1	11	7.0	1	0.6	1	0.6	2	1.3
18-Speaking	74	46.8	68	43	9	5.7	1	0.6	2	1.3	2	1.3
19-Speaking	53	33.5	52	32.9	31	19.6	10	6.3	4	2.5	6	3.8
20-Speaking	67	42.4	70	44.3	15	9.5	1	0.6	1	0.6	2	1.3
21-Speaking	84	53.2	54	34.2	12	7.6	1	0.6	3	1.9	2	1.3

22-Writing	80	50.6	51	32.3	17	10.8	5	3.2	1	0.6	2	1.3
23-Writing	59	37.3	59	37.3	27	17.1	5	3.2	3	1.9	3	1.9
24-Writing	52	32.9	68	43	25	15.8	7	4.4	1	0.6	3	1.9
25-Writing	46	29.1	74	46.8	25	15.8	3	1.9	5	3.2	3	1.9
26-Writing	61	38.6	67	42.4	23	14.6	1	0.6	1	0.6	3	1.9
27-Autonomy	71	44.9	58	36.7	17	10.8	4	2.5	2	1.3	4	2.5
28-Cooperation	47	29.7	61	38.6	35	22.2	7	4.4	1	0.6	5	3.2

Referring to Table 1, it is evident that a majority of students attribute varying degrees of importance to all language skills encompassing reading, listening, writing, speaking, grammar, and vocabulary. This affirmation is substantiated by the positive frequencies and percentages observed across the Likert-type questionnaire. Moreover, the data indicates a proclivity among students to cultivate their autonomy and cooperation skills, as underscored by the frequencies and percentages associated with the respective items, as presented in the subsequent tables. Furthermore, a closer examination of the data in Table 1 reveals notable variations in students' preferences. Specifically, items 12 ($\bar{x} = 5.52$) - "Listening to a speech in a conference given in English," 13 ($\bar{x} = 5.47$) - "Watching movies or TV programs in English," and 15 ($\bar{x} = 5.49$) - "Speaking informally in English with foreign tourists," garner the highest mean scores. Conversely, the lowest mean scores are attributed to items 4 ($\bar{x} = 4.42$) - "Reading English business documents/business e-mails," 5 ($\bar{x} = 4.79$) - "Reading English articles on the Internet," and 9 ($\bar{x} = 3.89$) - "Reading English textbooks."

In the subsequent analysis, a detailed exploration of these items is conducted, focusing on the four skills - reading, listening, writing, and speaking - as well as autonomy and cooperation. For construct validity, a comprehensive overview of mean and standard deviation scores for each item is provided in the Appendix B. Additionally, Table 2 presents a summary of descriptive statistics, encompassing mean scores and standard deviations, for the specific category of reading skills.

Table 2. Means and Standard Deviations for Reading Skill Items

Reading Skill Items	Science High School Students	
	<i>M</i>	<i>SD</i>
1. Reading English business documents/business e-mails	4.42	1.15
2. Reading English articles on the Internet	4.79	1.09
3. Reading English novels for pleasure	4.83	1.16
4. Reading English newspapers	4.51	1.17
5. Reading e-mails from foreign friends written in English	5.03	1.03
6. Reading English textbooks	3.89	1.40

The insights drawn from Table 2 provide a lucid depiction of the preferences of science high school students in the realm of reading skills. Notably, students exhibit a strong inclination towards the following activities, which they highly deem necessary: Reading e-mails from foreign friends in English ($\bar{x} = 5.03$), reading English novels for pleasure ($\bar{x} = 4.83$), reading English articles on the Internet ($\bar{x} = 4.79$), and reading English newspapers ($\bar{x} = 4.51$).

Conversely, the data reflects a relatively moderate need for the following activities: Reading business documents/business e-mails ($\bar{x} = 4.42$) and reading English textbooks ($\bar{x} = 3.89$). These discernible variations in mean scores emphasize the nuanced preferences of science high school students with respect to their reading practices in English.

Table 3. Means and Standard Deviations for Listening Skill Items

Listening Skill Items	Science High School Students	
	<i>M</i>	<i>SD</i>
1. Listening in meetings or small-group discussions at work with English-speaking members	5.11	1.20
2. Listening to take notes of a class lecture in English	5.41	.80
3. Listening to a speech in a conference given in English	5.52	.75
4. Watching movies or TV programs in English	5.47	.79
5. Listening to English language music	5.18	1.01

The findings elucidated in Table 3 underscore the pronounced enthusiasm of science high school students to elevate their English language listening skills. Specifically, the students exhibit a strong aspiration to enhance their proficiency for the following endeavours: listening to a speech in a conference (\bar{x} = 5.52), watching movies or TV programs (\bar{x} = 5.47), taking notes of a class lecture (\bar{x} = 5.41), listening to English language music (\bar{x} = 5.18), and listening in meetings or small-group discussions at work with English-speaking members (\bar{x} = 5.11). These results accentuate the students' eagerness to bolster their listening abilities across diverse real-world scenarios and contexts.

Table 4. Means and Standard Deviations for Speaking Skill Items

Speaking Skill Items	Science High School Students	
	<i>M</i>	<i>SD</i>
1. Speaking informally in English with foreign tourists	5.49	.81
2. Giving formal speeches/presentations in English at international conferences	5.26	1.00
3. Giving small speeches/presentations at work	5.33	.86
4. Giving small speeches/presentations in English in your classes	5.31	.88
5. Having discussions about general topics and current events in English with classmates	4.78	1.27
6. Having discussions about general topics and current events in English with foreign people	5.25	.87
7. Speaking to hotel and restaurant staff in English while travelling overseas	5.34	.95

Table 4 effectively portrays the considerable inclination of science high school students to cultivate their speaking skills in English. The data reveals a marked emphasis on honing their proficiency in the following contexts: Engaging in informal conversations with foreign tourists (\bar{x} = 5.49), communicating with hotel and restaurant staff during overseas travel (\bar{x} = 5.34), delivering small speeches or presentations in a professional setting (\bar{x} = 5.33), participating in classroom discussions (\bar{x} = 5.31), presenting formal speeches or presentations at international conferences (\bar{x} = 5.26), engaging in discussions about general topics and current events with foreign individuals (\bar{x} = 5.25), engaging in discussions about general topics and current events with classmates (\bar{x} = 4.78). Notably, the highest scores emphasize the strong desire to engage in informal conversations, while the lowest score suggests a certain level of hesitancy when it comes to interacting with classmates. This comprehensive overview underscores the diverse and context-specific aspirations of science high school students in improving their speaking skills in English.

Table 5. Means and Standard Deviations for Writing Skill Items

Writing Skill Items	Science High School Students	
	<i>M</i>	<i>SD</i>
1. Writing in English for course papers	5.27	.97
2. Writing business documents in English	5.00	1.08
3. Synthesizing information from more than one source	4.99	1.02
4. Writing e-mail letters in English to foreign friends	4.92	1.06
5. Writing e-mail business letters in English to foreigners	5.13	.96

Table 5 underscores the significant importance that science high school students attribute to enhancing their writing skills in English. Specifically, the data elucidates that students express a compelling need for their writing skills in the following contexts: Crafting course papers (\bar{x} = 5.27), composing business-related email letters to foreign friends (\bar{x} = 5.13), writing business documents (\bar{x} = 5.00), synthesizing information from multiple sources (\bar{x} = 4.99), and writing email letters foreign friends (\bar{x} = 4.92). These findings resonate with the students' recognition of the indispensable role that writing plays in both academic and professional domains, indicating a clear aspiration to bolster their writing proficiency across diverse communicative scenarios.

Table 6. Means and Standard Deviations for Autonomy and Cooperation Items

Autonomy and Cooperation Items	Science High School Students	
	<i>M</i>	<i>SD</i>
1. Getting the ability to research information in English	5.15	1.08
2. Doing group research with classmates in English	4.84	1.12

Table 6 demonstrates that the science high school students' aspirations for autonomy and cooperation in their English language learning journey. The data indicates that students express a notable desire for autonomy by aiming to develop the ability to independently research information (\bar{x} =5.15). Moreover, the students also showcase a substantial need for cooperation, as evidenced by their strong desire to collaborate on group projects with their classmates (\bar{x} = 4.84). These results lying within highly-needed range (4.50-6.00) underscore the students' recognition of the significance of self-directed learning and collaborative efforts in their English language development endeavours.

DISCUSSION

The present study employs a quantitative case study to address the language learning needs of science high school students pertaining to English language education. The findings of the investigation indicate a prevailing inclination among students to enhance their oral communication skills, encompassing both speaking and listening competencies. This outcome aligns with prior research (Avcı & Engin-Demir, 2021; İlgör, 2019) conducted within vocational and technical Anatolian high school contexts. However, it is noteworthy that students in science high schools exhibit a distinct preference for informal language geared towards daily interactions with foreign individuals, as reflected in the notably elevated mean score (\bar{x} = 5.49). This finding also resonates with Demir-Ayaz, Ozkardas and Ozturan's (2019) study indicating the need for speaking clubs in high schools in Türkiye.

This pronounced inclination towards colloquial language proficiency is also evident in the reading skills domain, exemplified by item 8, which pertains to comprehending emails from foreign acquaintances written in English. This item attains the highest mean score (\bar{x} = 5.03) within the reading skills section. Furthermore, the ability to compose emails directed at foreigners garners the second-highest mean score (\bar{x} = 5.13). These outcomes underscore the necessity of leveraging technological tools to facilitate global communication and the practical application of English language skills.

These findings substantiate the contention put forth by Flowerdew (2013) for embracing transnationalization and technologization as pedagogical strategies. To foster speaking skills in harmony with this approach, an integration of video-based listening exercises could be instrumental, given that listening is considered a foundational aspect of language acquisition, contributing to 45% of overall language competence (Renukadevi, 2014). Encouraging students to engage in video creation, podcasting, and even establishing personal YouTube

channels could serve to surmount challenges related to listening and speaking skills (Özen et al., 2013), as well as address content and material gaps (Erarslan, 2018) through technologically-immersive avenues.

Incorporating video-centric listening activities could also entail catering to students' inclination for acquiring both everyday English usage and academic and professional language competencies within the listening domain. This is underscored by the highest mean score (\bar{x} = 5.52) corresponding to the capacity to comprehend speeches presented in English during conferences, highlighting an enhanced need for academic-oriented language proficiency. This highlights their aspiration to refine listening abilities for scholarly pursuits rather than purely recreational purposes. Similarly, the most prominently scored item within the writing section (\bar{x} = 5.27) emphasizes the desire to proficiently craft academic papers, which can be attributed to their academic orientation.

Contrarily, science high school students exhibit a preference for honing their reading skills through commonplace materials such as emails from foreign contacts, constituting the highest mean score (\bar{x} = 5.03), alongside indulging in extensive reading endeavours like English novels for leisure (\bar{x} = 4.83), which secures the second-highest score. Ultimately, the findings indicate an inclination towards collaborative learning aligned with 21st-century competencies (Ataberk & Mirici, 2022) and self-directed learning, indicative of their aspiration for autonomy (Ozer & Yukselir, 2023).

In synthesis, the development of a tailored syllabus emphasizing practical language use for oral communication and reading activities, coupled with the integration of scholarly discourse reflective of contemporary scientific advancements for listening and writing exercises akin to ESP (Hyland, 2004), stands to enhance engagement among science high school students by catering to their unique linguistic needs, as endorsed by genre theory (Widodo, 2017) while acknowledging contextual particularities (Anthony, 2018). Moreover, this study corroborates the need for English curricula tailored to specific school types (MEB, 2018), elucidating distinct requirements for language skills, autonomy, and collaboration among science high school students. This finding is also endorsed by Tuzcu Eken's (2021) study which evinces that having a centralized curriculum at all levels of education is among the factors leading to low proficiency level in English according to Education First Company. Similarly, Alkan and Kartal (2018) support the need to acknowledge the idiosyncratic nature of schools. The formulation of such a specialized syllabus could notably contribute to the efficacy of EFL learning for science high school students by embodying needs-based, pragmatic, efficient, cost-effective, and utilitarian attributes (Hutchinson & Waters, 1987).

In conclusion, this study holds several implications for a range of stakeholders, encompassing educators, researchers, policymakers, and curriculum designers. Primarily, educators are encouraged to cultivate increased avenues for English language oral practice, not confining this effort to the classroom but extending it beyond through means like virtual exchanges on platforms such as Etwinning. Furthermore, the implementation of Erasmus projects could furnish students with opportunities to engage in English conversations with their peers, as proposed by Yüzlü (2024).

In terms of scholarly contributions, researchers are prompted to investigate whether similar priorities are shared by students in diverse educational contexts and institutions beyond science high schools. Furthermore, the proposal of a context-specific syllabus tailored to specific school types, supported by policy-makers, is endorsed as a more effective alternative to a uniform instructional approach. The endorsement of English language teaching programs that are contextually relevant and attuned to learners' needs, instead of adopting a *one-size-fits-all* methodology, is underscored. Additionally, policy-makers are encouraged to facilitate the development of customized syllabi for English language instruction, catering to the diverse educational orientations of institutions, such as academic, vocational, and project-based schools. Correspondingly, curriculum designers are urged to allocate greater attention to the language skills highlighted by students' needs and preferences.

Nevertheless, it is pertinent to acknowledge the limitations of this study. Geographical constraints confine the research scope to a specific area (Zonguldak), as convenience sampling was chosen based on geographical proximity and accessibility considerations, thereby bypassing the resource-intensive process of selecting a random sample (Cohen et al., 2000). Given convenience sampling, as it is not representative of the entire population, introduces bias, future research could employ random sampling techniques to mitigate this bias. A further constraint pertains to the relatively small sample size of the survey, involving 156 students, which limits generalizability. Consequently, future investigations with larger sample sizes are advised to expand upon the present findings concerning the EFL requirements of eleventh-grade students within science high schools. Additionally, the survey's lack of adherence to data triangulation, which can contribute to bolstering validity (Cohen et al., 2000), is acknowledged as a limitation. Thus, forthcoming research could implement data

triangulation and incorporate qualitative methods such as interviews to delve into the underlying motivations driving the desire to enhance the four language skills in conjunction with grammatical and lexical proficiencies. In doing so, future research could triangulate the findings with richer and more nuanced data and provide a more comprehensive understanding of student needs.

Moreover, the prospect of replicating this study in various educational contexts is considered worthwhile. Potential research avenues might extend to the perspectives of other stakeholders, such as educators and parents, potentially yielding a more comprehensive and compelling discourse. Despite these limitations, the study offers valuable insights into the language learning needs of science high school students. As the main agents of changes, teachers should not be indifferent to students' needs and instead question their practices, methods, and curriculum. (Gürsoy, 2018). Notably, it aligns with the assertion that "a strong teacher is a reflective teacher" (Hyland, 2003, p. 14), underscoring the necessity of educators' receptiveness to students' evolving and context-specific requirements. The study is projected to serve as a catalyst for subsequent research endeavours, prompting the alignment of English language teaching methodologies and materials with the discernible demands and needs of pertinent stakeholders, encompassing students, educators, parents, and educational administrators.

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APPENDICES

Appendix A. Questionnaire in Turkish

1. Genel İngilizce becerinizi geliştirmek için aşağıdaki becerilerden hangisini öğrenmek ve uygulamak sizce en faydalısı olur?

(1) Okuma (2) Dinleme (3) Konuşma (4) Yazma

2’den 28’e kadar olan sorularda her bir beceriyi hayatınızda ne kadar önemli hissettiğinizi belirtiniz.

(1) Hiç önemli değildir (2) Büyük oranda önemli değil (3) Az oranda önemli değil (4) Az oranda önemli (5) Büyük oranda önemli (6) Çok önemli

2. İngilizce derslerinde kelime çalışmaları yapmak ne kadar önemlidir?

3. İngilizce derslerinde dilbilgisi çalışmaları yapmak ne kadar önemli?

4. İngilizce iş dokümanları/iş e-maillerini okuyabilmek

5. İngilizce makaleler okuyabilmek

6. Keyif amaçlı İngilizce roman okuyabilmek

7. İngilizce gazete okuyabilmek

8. Yabancı arkadaşlardan gelen İngilizce e-mailleri okuyabilmek

9. İngilizce ders kitaplarını okuyabilmek

10. İngilizce konuşarak işlenen bir derste dinlediğini anlayarak not tutabilmek

11. İngilizce konuşan katılımcıların olduğu toplantılarda veya küçük grup tartışmalarında dinlediğini anlayabilmek

12. İngilizce yapılan bir konferansta konuşmayı anlayabilmek

13. İngilizce filmler veya televizyon programlarını izlediğinde anlayabilmek

14. İngilizce müziği anlayabilmek

15. Yabancı turistler ile İngilizce günlük konuşma dilinde konuşabilmek

16. Uluslararası konferanslarda İngilizce sunum/konuşmalar yapabilmek

17. İşte İngilizce küçük konuşma/sunumlar yapabilmek

18. Derslerde İngilizce küçük konuşmalar/sunumlar yapabilmek

19. Sınıf arkadaşlarıyla İngilizce genel konular ve güncel olaylar hakkında tartışabilmek

20. Yurt dışından insanlar ile İngilizce genel konular ve güncel olaylar hakkında tartışabilmek

21. Yurt dışına çıktığımda otel ve restoran personeliyle İngilizce konuşabilmek

22. Derslerde istenen İngilizce yazma çalışmalarını yapabilmek

23. İngilizce iş dokümanları yazabilmek

24. Birden fazla kaynaktan gelen bilgileri sentezleyebilmek

25. Yabancı arkadaşlara İngilizce e-mailler yazabilmek

26. Yabancılarla İngilizce iş mektupları yazıp e-mail ile göndermek

27. İngilizce bilgi araştırma becerisini edinmek

28. Sınıf arkadaşlarıyla İngilizce grup araştırması yapabilmek

Appendix B. The Mean and Standard Deviation of the Items Between 2 and 28

Item	Range	Mean	Standard Deviation
2	1-6	5.05	0.88
3	1-6	4.68	1.06
4	1-6	4.42	1.48
5	1-6	4.79	1.09
6	1-6	4.83	1.56
7	1-6	4.51	1.72
8	1-6	5.03	1.03
9	1-6	3.89	1.40
10	1-6	5.11	1.20
11	1-6	5.41	0.79
12	1-6	5.52	0.75
13	1-6	5.47	0.79
14	1-6	5.18	1.01
15	1-6	5.49	0.81
16	1-6	5.26	1.00
17	1-6	5.33	0.86
18	1-6	5.31	0.88
19	1-6	4.78	1.27
20	1-6	5.25	0.87
21	1-6	5.34	0.95
22	1-6	5.27	0.97
23	1-6	5.00	1.08
24	1-6	4.99	1.02
25	1-6	4.92	1.06
26	1-6	5.13	0.95
27	1-6	5.15	1.08
28	1-6	4.84	1.12