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# ИНФОРМАЦИОННЫЕ ТЕХНОЛОГИИ В ОБРАЗОВАНИИ

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## E-LEARNING IN ELEMENTARY SCHOOLS: EDUCATIONAL SYSTEM CHANGE DURING COVID-19 PANDEMIC

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**Abstract.** *Introduction.* New digital technology in education and its constantly evolving paradigm have completely transformed the model of learning and the learning methods. E-learning has become an important tool for teaching and learning environments. Moreover, virtual learning has become a required alternative teaching method in educational system change during the COVID-19 pandemic, especially for learners in elementary schools.

*Aim.* This research aimed to explore the necessities, lack, and want of learning English, which is done virtually at home.

*Methodology and research methods.* This research employs descriptive methods using questionnaires and interviews as instruments to get responses from teachers and students about their learning needs. In the course of the needs analysis process, the importance and priority of teachers' and students' needs are discussed. The participants of this study were second-grade elementary school students, and the sample was 40 students and 2 English teachers for 10 months.

*Results.* The research results demonstrate a gap between the needs of learners and current conditions; therefore, the whole language approach, the multimedia, and technology-based English teaching materials will become an inevitable need and even become a solution in the world of education.

*Scientific novelty.* Further research is needed to study educational system change during the COVID-19 pandemic or after, especially in designing teaching materials in various disciplines and at different educational stages. Future studies could be generalised by these research findings to other populations in different learning contexts, and the findings presented in this

article should be further explored. In particular, technology-based and multimedia-based teaching materials must be explored more deeply. Furthermore, further research should focus on utilising a different model for needs analysis in language education to verify the need for effective English learning in changing the education system during the pandemic and after.

*Practical significance.* It is thought that this study will contribute to the stakeholders in terms to provide empirical evidence of what necessities, lack, and want should be considered when a teacher will design and develop teaching materials during the COVID-19 period or after.

**Keywords:** need analysis, e-learning, COVID-19, elementary school, multimedia and technology.

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## ЭЛЕКТРОННОЕ ОБУЧЕНИЕ В НАЧАЛЬНОЙ ШКОЛЕ: ИЗМЕНЕНИЕ СИСТЕМЫ ОБРАЗОВАНИЯ ПРИ ПАНДЕМИИ COVID-19

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**Аннотация.** *Введение.* Новые цифровые технологии в образовании и их постоянно развивающаяся парадигма полностью изменили модель и методы обучения. Электронное обучение стало важным инструментом учебной среды, необходимым альтернативным методом при изменении системы образования во время пандемии, особенно для учащихся начальных школ.

*Цель исследования.* Данное исследование было направлено на изучение потребностей и недостатков в дистанционном изучении английского языка.

*Методология и методы исследования.* В настоящем исследовании используются описательные методы с применением анкет и интервью в качестве инструментов для получения ответов учителей и учеников об их образовательных потребностях. В процессе анализа обсуждаются важность и приоритет потребностей учителей и учеников. Участниками исследования в течение 10 месяцев были 40 учеников второго класса начальной школы и 2 учителя английского языка.

*Результаты.* Результаты показали, что существует разрыв между потребностями учащихся и текущими условиями, так что весь языковой подход, мультимедийные и технологические учебные материалы по английскому языку станут неизбежной потребностью и даже решением в мире образования.

*Научная новизна.* Необходимы дальнейшие исследования для изучения изменений в системе образования во время или после пандемии, особенно при разработке учебных материалов по другим предметам и на разных этапах обучения. Результаты, представленные в этой статье, требуют дальнейшего изучения. В частности, необходимо более глубоко изучить учебные материалы, основанные на технологиях и мультимедиа. Кроме того, в дальнейших исследованиях нужно использовать другую модель анализа потребностей в языковом образовании, чтобы проверить необходимость эффективного изучения английского языка для изменения системы образования во время и после пандемии. В будущих исследованиях результаты данной работы могут быть обобщены и применены к другим группам населения в различных контекстах обучения.

*Практическая значимость.* Настоящее исследование предоставит заинтересованным сторонам эмпирические доказательства того, какие потребности, недостатки и желаяния следует учитывать, когда учитель будет разрабатывать учебные материалы в период пандемии COVID-19 или после нее.

**Ключевые слова:** анализ потребностей, электронное обучение, COVID-19, начальная школа, мультимедиа и технологии.

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## Introduction

The school closures that were carried out for nine months (from March to the end of December) caused a learning gap resulting from the COVID-19 pandemic. This phenomenon is experienced almost all over the world. It is exacerbated by socioeconomic differences [1], such as suitable places to do school work, electronic devices, Internet access, and books used [2] and the ability of parents to protect their children. Besides, for children with special educational needs, such as those with intellectual disabilities and children with certain learning disabilities, the learning process may be more influenced by school closure [3]. Therefore, children with pre-existing general and specific learning difficulties will widen the achievement gap due to school closures due to the COVID-19 pandemic. How do schools solve this problem? The education system must plan to reduce the achievement gap that increases once the pandemic is over or under control and schools reopens.

If it is true that there is an opportunity [3, 4], teachers can take advantage of the constraints caused by the pandemic and rethink not only space and time but also activities and learning materials to adjust to new education. This strategic opportunity should start from primary school because, at the same time, it is less adaptable to online learning but may be more effective in reducing the achievement gap. The current COVID-19 pandemic emphasises how education is promoted by recognising the need for effective learning materials

and reducing gaps between children. This is a crucial issue, considering that the study at home policy in educational institutions is causing major disruptions.

The COVID-19 pandemic is the biggest challenge facing the national education system today. The development of education provision at all levels has undergone a significant shift from face-to-face teaching to online teaching. Arnott and Yelland [5] conceptualise digital technology as social, cultural, and personal artefacts that inhabit the world of contemporary children's lives and contribute to their learning. However, it is unfortunate that teaching materials do not accompany them under the prevailing conditions. Teachers must provide comfort to students [6] wherever they study at school or home, and they can access teaching materials anytime and anywhere. Even after the pandemic ends and returns to normality, it will not be simple to return to the old life. Educators must take precautions against the second and third waves of the COVID-19 outbreak. The expansion of online learning in schools will be accelerated further, and schools will organise themselves systematically to pursue aspects of technology-based learning. Internet technology and mobile phone have changed the education system from traditional to modern. Technology in education benefits not only students but also teachers in delivering lessons and making classrooms more enjoyable and learning available at all times [7]. Laderman states that because of the COVID-19 pandemic, teachers and students alike are in a situation where they feel compelled to embrace digital academic experiences to summarise the online learning process [8].

Many teaching material development research conducted during the COVID-19 pandemic has been carried out, such as virtual development designs for teachers during the pandemic [9]. The Indonesian people's socio-cultural conditions have not been able to quickly follow the online learning system [10–12], so it is necessary to know the needs of teachers and students for learning materials. However, few studies have reported developing English language teaching materials designed for primary school students by analysing students' and teachers' needs for technology. Technology-assisted language learning has been effective in promoting student activities and their initiatives while learning English is effectively promoted [13]. Digital technology can grab students' attention and inspire their learning through interactive feedback [14] and parents' support for it [15, 16]. However, some parents experience difficulties and are resistant to online learning [17].

Moreover, learning using computer-based interactive multimedia can increase direct interaction between students and learning resources [18, 19]. Learners must also become independent learners [20], including studying independently at home [21]. To fill this empirical gap, a needs analysis of the changing education system during a pandemic, aims to explore the needs,

difficulties, and desires of virtual home English learning. Furthermore, this study also follows up on Saud's research [22] and explores other samples and contributes to the wider population to reform English lessons to be more inclusive as a trend of online learning resources. The contribution of this research is to provide empirical evidence of what needs, difficulties, and desires should be considered when a teacher designs and develop teaching materials during the COVID-19 period or after that. Thus, teachers and students as users of teaching materials can be the basis for further developing teaching materials. Therefore, this research is focused on the teaching materials needed by students and teachers during a pandemic as one of the novelties of this research. The limitations of this research are in the sample of this study which was conducted because it is a private elementary school located in the capital city of Jakarta, which is one of the favourite private schools and has diverse students from ethnicity, culture, race, and language. This study also needs new efforts with different populations and with a needs analysis approach which requires to be further explored.

## Literature Review

### Need Analysis

Learning needs that everyone wants are different in each country. Learning needs must be identified through an individual approach. A need is a permanent tendency that exists in a person's motivation to achieve a certain goal. Important learning needs to be identified as the basis for the preparation of learning materials. The importance of learning needs is the basis for describing the distance between the learning objectives desired by students or the actual learning conditions. Learning needs will be arranged carefully and sequentially, and then the priority of learning needs is determined. It is called a needs analysis. Needs analysis is a procedure for gathering information about student needs. The aim is to establish the main learning outcomes and requirements in designing and delivering learning activities [22]. Needs relating to primary school characteristics, student concerns, and potential constraints, the analysis seeks to match possible techniques and materials with the needs of this pandemic.

Needs analysis means a plan for gathering information to make decisions about priorities; needs analysis consists of the right questions to effectively extract all the right information as a guide for developing teaching materials [23]. Requirement's analysis is a method to determine the difference between the desired conditions and existing conditions. The desired condition is often called the ideal condition, while the existing condition is often called the real condition [24]. So it can be concluded that needs are a gap between what is already available and expected. [25] divides need into *target needs* related to what students need

to do something in the target situation, and *learning needs* related to what ways students can learn. Analysis of the target needs attention to three aspects: need to know (*necessity*), aspects of deficiency (*lack*), and aspects of desire (*want*). Necessity is determined by the type of requirement target situation that the learner should know to function effectively in the target situation. Lack is a type of need concerning what is already known to the learners so that teachers can determine which of these are required that have not been mastered by the learner. Want is the view of students about what they want.

Needs analysis is a comparison of the results of the analysis against *necessity*, *lack*, and *want*. The meeting point between these three aspects is what is said by the needs analysis in this study (Fig. 1).

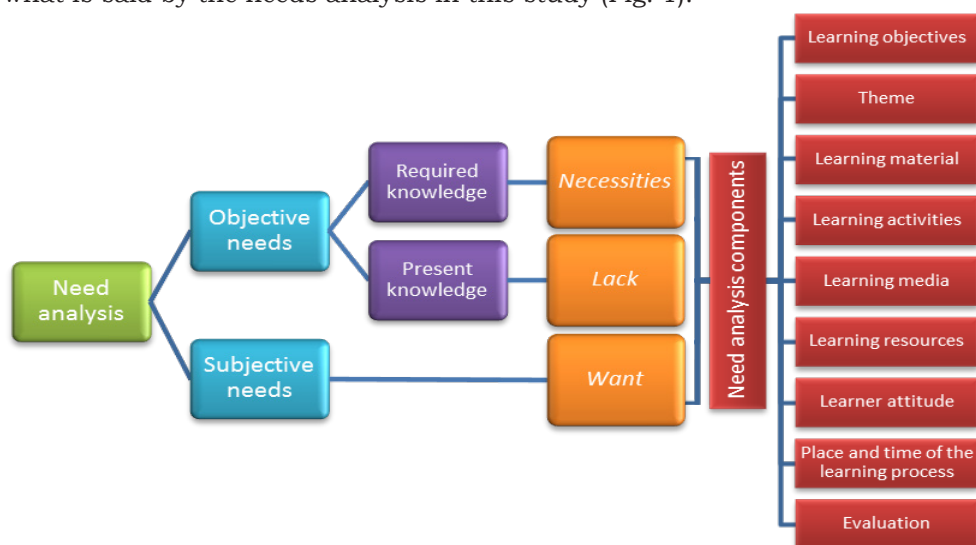


Fig. 1. Need analysis components

## Materials and Methods

### The Study and Participants

This research is a descriptive method that aims to describe teachers' and students' needs for English teaching materials. Descriptive models in needs analysis can determine the identification of language needs situations [26]. Research more often uses descriptive models and surveys in determining language needs. This research sample is the second-grade elementary school students in Jakarta, as many as 40 students from 2 different classes and 2 English teachers from the two classes. The instruments used were questionnaires and interviews, which aimed to get responses from teachers and students about learning needs in a pandemic situation and after. The qualitative

study for teachers used a narrative framework, an opening sentence template that encourages respondents to express and reflect on their experiences on a given topic [27], to gather perspectives from elementary school English teachers. In addition to providing many resources, that narrative also enables teachers to connect past experiences with the current context, linking English learning during the COVID-19 period.

### **Data Collection**

The teachers are given the initial outline of the opening sentence with several questions shown through the message. To avoid the teacher's burden, interviews were conducted via video call (WhatsApp), then meet in schools with health and safety protocols, and teachers were told that they could spare time when they had completed their teaching assignments. The use of video calls as a research tool rarely occurs in language teaching research, but interviews and questionnaires with video calls can be justified in situations where there is an outbreak of disease that is dangerous to encounter directly [28]. After completing the interview with the teacher, interviews will be conducted with students for 45–60 minutes per student. Due to a large number of students, the researcher first scheduled a video call with the parents to determine the time to be used in the interview. Video call or interview completed within three weeks. There are nine components of the needs analysis investigated, namely 1) learning objectives, 2) themes, 3) learning materials, 4) learning activities, 5) learning media, 6) learning resources, 7) learning attitudes, 8) where and when the learning process and 9) evaluation (see Appendix).

### **Data Analysis**

The data analysis used is the percentage, and then the percentage is analysed qualitatively to obtain in-depth and holistic information. Besides, interactions occur when the interview is conducted, students will provide their opinions and suggestions. The following methods of data analysis were used: 1) identifying and assessing teachers' and students' responses, 2) performing a percentage of teachers' and students' responses, 3) sorting the percentage of teachers' and students' responses, 4) determining the level of student needs based on three aspects, namely Necessity, Lack and Want.

## **Results and Discussion**

### **Teacher Needs**

1) *Interview Results Analysis (Necessity)*: The two teachers stated that learning English is currently by the applicable curriculum, namely according

to thematic. The theme of learning English has met the overall social context in schools, homes, society, and current global developments. However, learning English has not yet reached the desired competency maximally. The activities in the class were readouts, and the students answered independently. Books were the only media used during the classes; the teacher had never used technological devices in learning. However, during the pandemic, learners used the Internet to access videos taken on YouTube. Students have not been able to study independently at home and still need parental guidance.

2) *Results of the Needs Analysis Questionnaire (Lack)*: Teachers do not have difficulty achieving goals and determining topics for learning English because they use printed books. However, the two teachers experienced difficulties in mapping learning themes with technological developments. The teacher also has difficulty teaching English material and difficulties in using non-printed material sources in English learning such as video, animation, audio, etc. Teachers have difficulty if students cannot independently learn English. Besides, each teacher experienced difficulties in determining the right teaching strategies, and the use of smartphones in learning was also quite difficult. The limited time in learning English is also considered to be giving students difficulties and difficulties in designing online tests.

3) *Results of the Needs Analysis Questionnaire (Want)*: Both teachers stated that they need a variety of English themes through technological developments. Teachers also need books and references that can help learners understand the material optimally. Besides that, the teacher wants the content of language material in the classroom to support students' understanding of English and the need for instruction designs and strategies and teaching methods appropriate and relevant for learning English (pandemic). Teachers need smartphones and Internet facilities in learning English and supporting online learning. Non-print learning resources are needed so that students can access them anywhere. Teachers want students to study independently because it takes a long time to learn English with exercises that they can access at home, and teachers also really want an English online test.

The teacher proposes to develop English teaching materials as follows:

Teacher: *for learning English during this pandemic, interactive videos in English are needed because of the importance of attracting children's interest first in learning.*

The demonstration of lack and want needs analysis can be seen in Fig. 2 below:



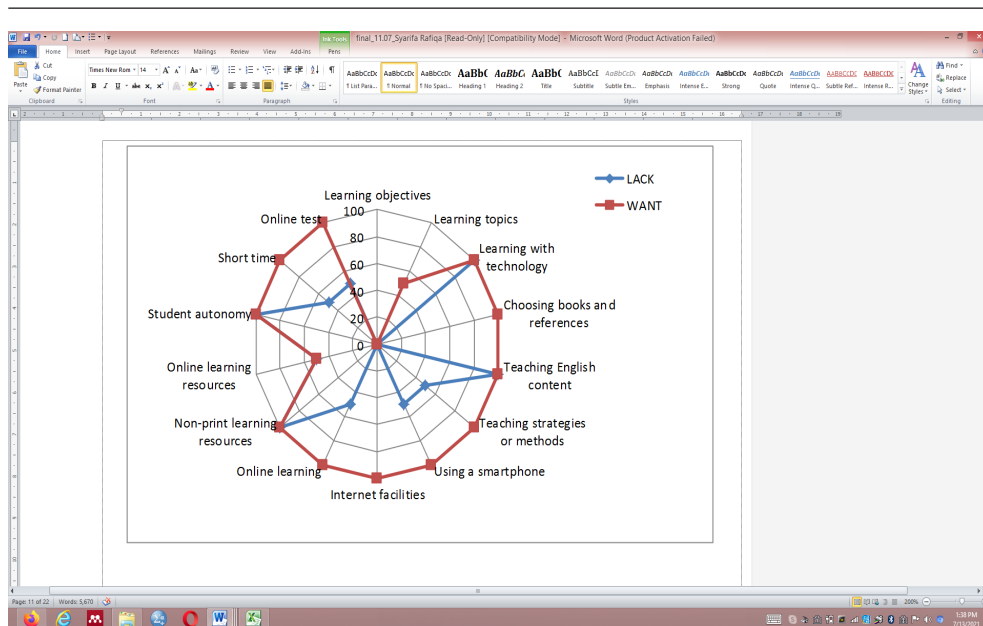


Fig. 2. Teachers' needs analysis (Lack & Want)

### Student Needs

1) *Questionnaire results from needs analysis (Necessities)*. Students who like English lessons and English skills such as speaking, listening, writing and reading are 94 %. 71 % of students stated that English was an easy subject. However, liking English is not directly proportional to its daily use with friends (12 %) and family (24 %). Students who use Internet facilities for the English learning process are 59 %. The use of media in learning English is 41 %; 82 % of students strongly agree to use the Internet in learning English and 94 % of students use videos, photos, and pictures in learning. 94 % of students like English books with pictures. The remaining 35 % of students who can learn English independently at home will study if they have assignments. 88 % of students also really want to learn English with various media using Internet facilities (Fig. 3).

It can be concluded that what learners should know, most importantly, skills in English. They strongly agree that learning English uses videos, photos, and pictures. Students also like English books that have many pictures. Students enjoy learning English using the Internet and various media on the Internet. Students are also not used to learning English independently at home, even though students like English, but only a few people use it in their daily communication.

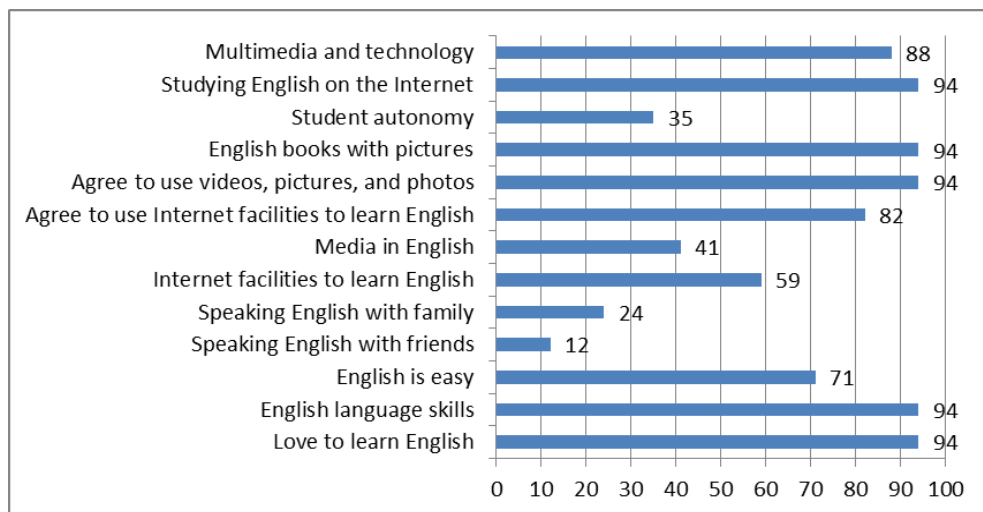


Fig. 3. Students' need analysis (necessities)

2) *The questionnaire results from the needs analysis (Lack).* 59 % of students have difficulty in achieving the goals of learning English. Students have difficulty understanding topics to achieve competency (94 %) and also difficulty understanding English content (47 %). 29 % of students have difficulty pronouncing English words, and 47 % of students have difficulty doing English assignments. In using a smartphone, only 12 % of students have difficulty using the Internet, and only 24 % of students have difficulty using the Internet, and 47 % have difficulty learning online. In the use of learning resources, the difficulty of using printed learning sources is 24 %, and the difficulty of using online learning sources is 41 %. 65 % of students have difficulty learning independently at home. 47 % of students have difficulty learning English at school, students also have difficulty learning English because of the short amount of time (71 %), and 41 % of students who have difficulty doing English assignments (Fig. 4).

Learners' already-known needs are used to determine which ones have yet to be mastered. Students have difficulty understanding the learning topic, the difficulty of students to learn independently at home, and difficulties learning English goals. The very short time involved in learning English is also a major obstacle. Furthermore, some students have difficulty doing English assignments and studying online.

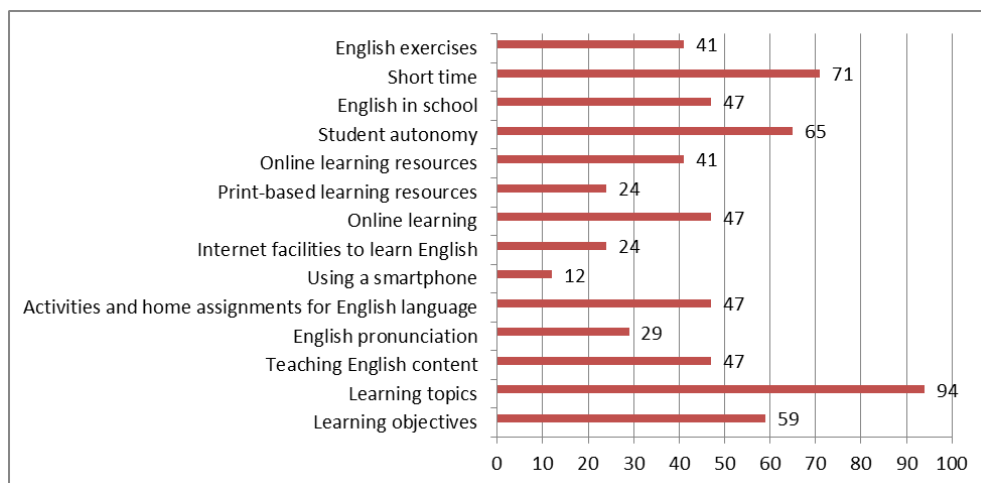


Fig. 4. Students' need analysis (Lack)

3) *The questionnaire results from the needs analysis (Want).* Students learn English to be able to communicate orally, and in writing, they also need a special topic from the teacher's theme and require a theme variation of 94 %. 71 % of students need to explain the contents of the English language material and 94 % of students need videos to understand the material. 88 % of students need learning instruction in Indonesian. Also, students need: smartphones (65 %), Internet facilities (82 %), and online learning (88 %). 100% of students need print learning resources and 82% of them need online learning resources. Students needing independence in learning account for 94 %, students needing to study English at school account for 100 %, and students needing a long time to understand English account for 65 %. Approximately 88 percent of students require assistance with their English homework (Fig. 5).

Students' views on what they want to learn in English. What students need most is learning English in school, using printed books, and needing videos that can help them understand the material provided by the teacher with various themes and special topics from these themes so that they can communicate in written and verbal form. Moreover, students also need online learning that can be accessed independently by students at home using a smartphone connected to the Internet to adjust study time according to student needs.

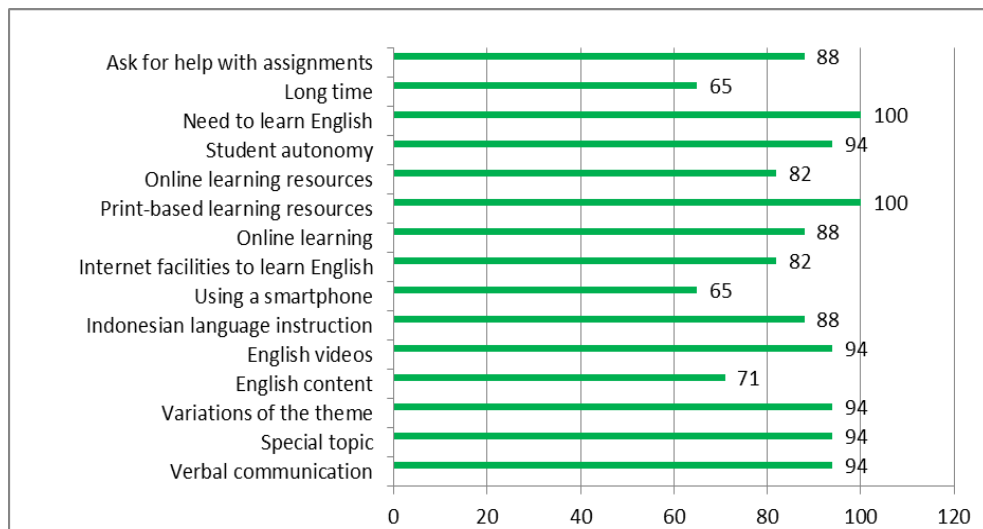


Fig. 5. Students' need analysis (Want)

### Model Teaching Materials Based on Need Analysis

The development model of English teaching materials that will be developed based on the needs analysis results can be seen in Fig. 6. The needs analysis results are following the desires of learners, whether what the learners have not mastered, and what learners should and need to know.

What must be known by teachers and students (necessities) is that English language skills that must be mastered by elementary school students cannot be separated (holistic); in line with it [29] explaining that a whole language approach can be maximally achieved if language mastery is approached holistically. Using multimedia is also a solution so that students can easily understand difficult knowledge in a short time. It was also expressed [30–33] that multimedia contains learners to easily understand difficult knowledge and provide much information for learners in a short time, and multimedia also increases learning effectiveness, can maintain learners' attention more interesting, entertaining and educational [34]. Along with the spread of technology in education thus increasing the opportunity to design learning environments that stimulate more than one channel (video animation, photos, and images) [35, 36].

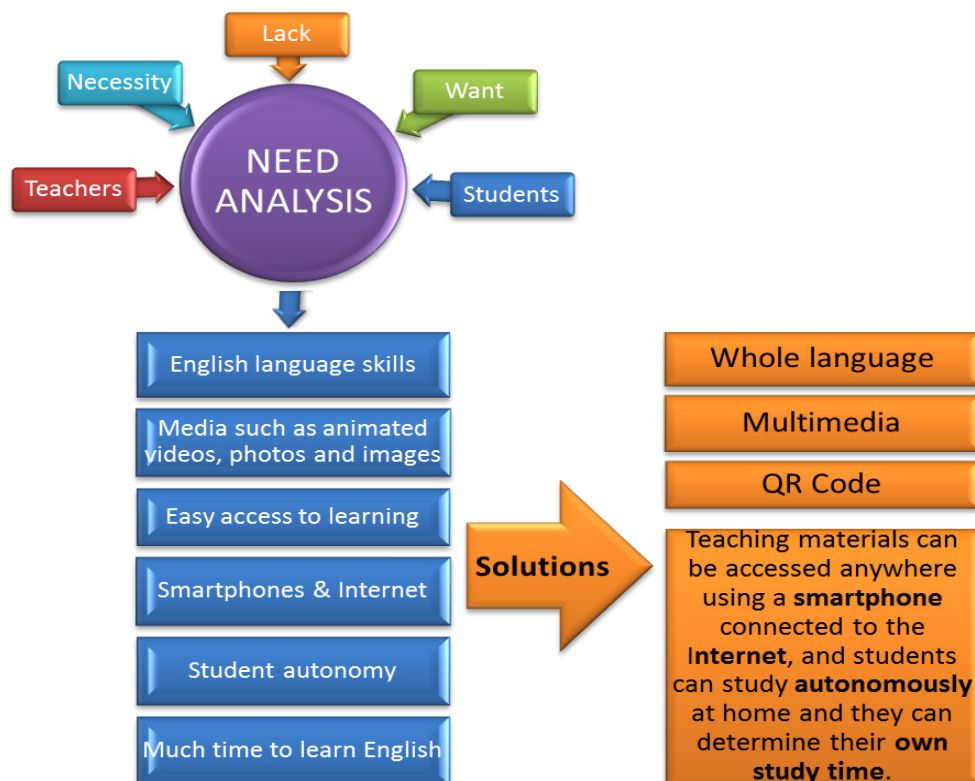


Fig. 6. Need analysis solutions

Learning that is easily accessible anywhere is also very necessary for learners to study independently at home with easy access to the material and audio provided via the Internet using the QR code contained in English textbooks. QR codes are machine-readable optical 2D matrix barcodes that are easily displayed physically on digital media on the screen [37]. The ease of accessing this learning is very important because students' flexibility of time and place can be determined by students during the pandemic period or afterwards. It is a precaution against the second or third wave of the outbreak. The expansion of online learning in education will be accelerated, and schools will organise themselves more systematically to pursue aspects of technology-based learning [38]. So that in the end, multimedia and technology-based English teaching materials will become an inevitable need, even a solution in the world of education.

## Conclusion

This study reports an analysis of the need for English teaching materials in elementary schools with changes in the learning system during the pandemic or after. Learning needs analysis must accomplish to achieve the optimisation of the English teaching material model. There is a gap between the needs of learners and the current conditions. So that the development of multimedia technology promises the great potential to change the way children learn, get information, adjust information [39], absorb information quickly and efficiently [40, 41], and can promote learning [42, 43]. Thus, the validity of multimedia principles has been demonstrated in various studies, one of the most established principles in designing teaching materials [44]. This study is also urgent in generalising these research findings to other populations in different learning contexts, and the findings presented in this article should be further explored. In particular, technology-based and multimedia-based teaching materials must be explored more deeply. The approach used in the needs analysis consists of four models, namely the mixed model, survey, descriptive, and experimental [26], but further research needs to utilise a different model for needs analysis in language education to verify the need for effective English learning in changing the education system during a pandemic and after.

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**Appendix**

**Interview Guidelines for Need Analysis**

For more details, please see the following link or QR Code.

Link: <http://bit.ly/IntInterviewGuidelinesforNeedAnalysis>

