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Review of Brainly Applications Based on Principles and Paradigms of Human-Computer Interaction

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ABSTRACT

The Brainly application has a user interface that is user friendly and easy for users to understand. The suitability of icons, colors, feature layouts, and instructions means that users do not need to use guidebooks or get confused looking for application instructions, users only need to imitate behavior according to the knowledge they understand. Based on the results of the study through several aspects, namely aspects of human, technology, usability, and ergonomics. This application is in great demand by users or users, especially students because this application makes it easy to learn in a fun and interesting way with presentations that are not only in the form of text but contain content in other forms such as videos, animations, and practice questions on each topic. Then at the end of the lesson a report on learning outcomes with interesting technology is presented where the user can find out the extent of his ability on each topic being worked on. Apart from that, there is no doubt about its functionality, because Brainly is an online learning platform that provides experienced private teachers who can be easily found through its learning services.

Keywords: Application, Brainly, Human Computer Interaction, Learning, Technology

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1. INTRODUCTION

Entering the era of globalization, which is synonymous with the term modernization, all aspects of life have changed. These changes follow the rapid development of technology. Technology is one of the most attractive propositions for anyone today. Globalization is a renewal process that covers all aspects of life and uses technology as the main resource. Technology is the most important tool in all developments, including in the field of education. The goal of implementing education is to help people develop according to their abilities, and teachers must be able to understand them in their realities, possibilities, and ideals. Additionally, educators must know how to promote the changes they desire (Amri, 2016).

Because science and technology are developing very quickly, learning is no longer limited by the presence of a teacher in the classroom. Students can learn anywhere and anytime. Students can learn anything based on their different interests and learning styles. A learner designer must be able to plan learning by using different media and appropriate learning resources in such a way that it becomes

fun, efficient, and effective. Rossi and Biddle (1966:3) define learning media as any tools and materials, including radio, television, books, newspapers, magazines, and others, that can serve educational purposes. In the teaching and learning process, we typically interpret the concept of media as a graphic, photographic, or electronic tool that collects, processes, and reorganizes visual or verbal information (Sholihatun & Utanto, 2020).

2. LITERATURE REVIEW

2.1. Human and Computer Interaction

Interaction is communication between two or more objects that affect each other. This interaction does not work if one of the interacting objects encounters obstacles. Human-computer interaction is a two-way communication between a user and a computer system that helps each other achieve certain goals. ACM SIGCHI defines human-computer interaction as a discipline that studies the design, evaluation, and implementation of interactive computer systems for human use, as well as the key factors of interactive environments (Décieux et al., 2019).

Understanding human-computer interaction is a scientific discipline concerned with the design, evaluation, and implementation of interactive computer systems for human use, as well as the study of the key phenomena involved. Human-Computer Interaction is a study that examines the interaction between humans, computers, and tasks (Alhaq et al., 2021). The principle pertains to how humans and computers can collaborate to perform tasks and create interactive systems. Another definition of HCI is that when building an information system, the system designer or developer "must pay attention to the human-computer interaction factor, because information systems are made by humans and their purpose is for humans".

Based on the above explanation, human-computer interaction is not only about the appearance of the user interface but also about user aspects, system design implementation, and environmental phenomena. For example, the system is simple to use, learn, etc. Designers should design computers and other devices so that users have a specific purpose or task and want to use them according to the task's characteristics. To complete the system, the designer must know how to think in terms of the actual user's task and translate it into the system.

2.2. Human Computer Interaction Scope

Human-computer interaction consists of three components: humans, computers, and interaction. The three components are mutually supportive and interconnected. Users are the people who use computers. These users are diverse and possess unique characteristics that align with their specific computer needs and capabilities. A computer is an electronic device that includes hardware and software. As we know, the working principle of a computer consists of input, processing, and output. This computer operates according to the user's instructions. The user gives commands to the computer, and the computer prints or writes the answers on the screen.

1. Human aspects

   Humans process information by receiving input, storing it, processing it, using it, and reacting to it. Humans receive information through their five senses, particularly when using a computer, which includes seeing, hearing, and touching. Storage is either temporary in sensory or working memory or permanent in long-term memory. We can then use it for reasoning and problem solving. The familiar situations that occur often offer people the opportunity to acquire skills in a particular area when the structure of knowledge becomes clear. However, errors can also occur if the context changes (Romario et al., 2020).

Human perception and cognition are complex and sophisticated, but not unlimited. There are some limitations to be aware of here. Understanding human capabilities and limitations as information processors can help us design interactive systems that support the former and compensate for the latter. The principles, guidelines, and models of cognitive psychology, as well as the techniques they provide, are invaluable tools for interactive system designers. Humans are considered highly complex, inconsistent, and less than deterministic (Utami, 2010).

People are the first and most important aspect because people are the subjects of computer systems. Computer systems help people solve problems more effectively and efficiently. Human studies of the IMK should result in systems that are reliable, safe, and convenient for people. It was human limitations in computing that motivated the creation of computer systems. Individuals' available channels limit the information they receive and the responses they can provide. Humans have access to vision (visual), hearing (auditory), touch (haptic), and movement (movement) as input channels, and they also store information in their memory. Humans treat and process the stored information with consideration for problem solving and human capabilities.

Therefore, programmers must understand human capabilities and limitations, as well as how to create reliable and safe systems for human use. We can achieve this by studying how people perceive their environment, store and process information, solve problems, and interact physically with objects, all from the perspective of human cognitive psychology (Utami, 2010).

2. Technological Aspects
   From a technological perspective, the concept of human and computer interaction encompasses several components, including the following:
   a. Memory
      In general, memory serves three functions: as a filtering place (sensor), as a place to process memories (short-term memory), and as a long-term memory.
   b. Sensory Register
      The system consists of three filter channels: iconic, which serves as a mechanism for receiving visual stimuli, echoic, which processes sound stimuli, and haptic, which receives stimuli in the form of touch.
   c. Storage
      IMK generally divides storage into two types: internal storage (human brain) and external storage (computer memory).
   d. Input
      Input devices encompass both text input devices and pointers used in system design.
   e. Output
      The display process that a system or application uses to run the program is part of the output process in IMK.

2.3. Ergonomics Aspects

Ergonomics is the science of people trying to improve comfort in their work environment. The term ergonomics consists of the Latin words ergon (work) and noma (natural law). This term is understood as the study of the human aspects of the work environment, taking into account anatomy, physiology, psychology, technology, management, and design (Cahya Indra Kusuma, 2015). The purpose and objective of the ergonomics discipline is to obtain comprehensive knowledge about the

problem of human interaction with technology and its products so that it is possible to design an optimal human-machine (technology) system.

Therefore, the discipline of ergonomics views the problem as a system that can be solved through a system approach process (Ibrahim & Maita, 2023). Ergonomics is the study of human-machine environmental systems, human factors, and ergonomics to create systems that are comfortable, safe, productive, and easy to use (Sabihaini, 2006).

2.4. *Usability Aspects*

The usability aspect is research on human-computer interaction (HCI), which refers to the user's point of view when using and enjoying the product. The definition of usability according to the International Organization for Standardization (ISO 9241-11 for short) is "the extent to which a particular user uses a product to achieve specific goals effectively and efficiently and achieves satisfaction during use." Assessing usability is an important activity in developing interactive systems. The user interface design must go through iterations and design evaluations until it shows satisfactory results and is simple to learn. The most important evaluation of the system is the identification of usability factors. Human-computer interaction primarily uses usability ratings (Anshori Aris Widya et al., 2016). Specifically, the objectives of usability are as follows:

a. Effective for use (effectiveness)
b. Efficient to use (efficiency)
c. Safe to use (safety)
d. Has good utility (utility)
e. Easy to learn (learnability)
f. Easy to remember how to use (memorability)
g. Easy to access (accessibility)
h. error prevention
i. Visibility

In the interactive application development process, usability testing and user-centered design techniques have been identified as important factors, and their application should be considered. However, (Marpaung, 2017) notes that many software development programs have not observed these factors in practice

2.5. Brainly app

Brainly is a company that operates in the education sector. Brainly, a modern service with a large user base, is accessible on various devices such as iOS and Android. In practice, Brainly users have the ability to pose questions to other users or respond to their inquiries. The site provides three training levels: elementary, middle, and high school. With this one service, users can customize their education level. In addition, the service offers 25 different topic categories simultaneously.

Brainly is a service founded in 2009 by Lukasz Haluch, Michał Borkowski, and Tomasz Kraus. Initially, the service was in Polish and was called Zidane.pl because Brainly was founded in Krakow, a city in Poland. The trio observed a group of students who expressed a desire to assist their peers with homework. This initial motivation led to the development of Brainly, a service designed to facilitate simultaneous use by multiple students. The main goal of Brainly is to give students the opportunity to do their various homework online. Many users are willing to answer and complete difficult tasks, making them easier to complete.

During its development, Brainly gained recognition and usage in Russia, Brazil, and Ukraine. As a result, the service is seeing an increasing number of users, and it has also gained recognition in the United States. To date, Brainly has more than 25 million users in various countries. Of course, this number will continue to increase as more students are interested in using the service. Brainly has shifted its operations from Poland to its new HQ in New York. This will definitely allow the service to continue to grow and reach more users from different parts of the world.

School teachers and students specifically target this unique and novel concept, where they can "meet" and help each other solve various problems and issues related to education. Users on Brainly receive points for providing answers, which they can accumulate to enhance their reputation within the community. Students and teachers can use Brainly for free. However, if you want to access questions from difficult categories and need detailed answers, you can use Brainly's paid service.

3. METHODS

Human and Computer Interaction (HCI) principles and paradigms are used to study the Brainly application. This is done by analyzing the Brainly application and finding human aspects, aspects of technology use, usability aspects, and other aspects that can be analyzed in the Brainly application. The following stages involve the execution of data collection techniques.

1. Observation : Watching how users interact with the Brainly application.
2. Interview : Interviewing users about their experience with the Brainly app.
3. Questionnaire : Distribute questionnaires to users to gather information about their habits and preferences when using the Brainly app. Their habits and preferences in using the Brainly app are discussed.
4. Testing : Conducting user testing to evaluate the usability aspects of the Brainly application on its users.

While the aspects analyzed include the following description,

1. Human aspects:
   a. User needs and characteristics
   b. User motivation and goals
   c. User experience and preferences
2. Technology Utilization Aspects:
   a. The Brainly app offers a variety of features and functionality.
   b. Usability and benefits of the Brainly app.
   c. The impact of the Brainly app on users
3. Usability Aspects:
   a. The Brainly app is easy to learn and use.
   b. Effectiveness and efficiency of using the Brainly app
   c. User satisfaction with the Brainly app

4. RESULTS AND DISCUSSION

4.1. Human Aspects of the Brainly Application

The Brainly application boasts an attractive and easy-to-understand user interface. Users can easily see the features of the Brainly application. Figure 1 displays the user interface.

Figure 1. Brainly Application Usage View

In terms of features, the Brainly app offers features that are considered usable. The content, which includes text-based material, educational videos, and educational animations, is presented in an engaging manner to make it easy for users (humans) to understand.

4.2. *Technological Aspects*

The Brainly application demonstrates several technological features.

1. Inputs
   The Brainly app adapts to the installed device's keyboard and navigation when it comes to input. Pointers and text input devices also allow you to copy or paste the Brainly app. A pop-up keyboard (touch screen) appears during the input process based on the type of task (letters or numbers).
2. Sensory Register
   Hovering the cursor/pointer over the input field prompts the display of the keyboard, as illustrated in the image above. The menu immediately displays the available/proposed options for the selected content, which is equally stimulating.
3. Storage
   The storage technology used in the Brainly app is online storage within the app, regardless of whether the material (text/video, etc.) is stored online. The relatively small app capacity/size of Brainly allows for its installation and use on multiple supported smartphones.
4. Output
   Each session includes different content, including text and video presentations and practice questions. The Brainly app displays text or video results on the same screen, not in separate frames or tabs. At the end of each learning content, users then receive a learning success report. Through the report, users can determine the level of activity and success associated with each examined material content.

4.3. Usability Aspects of the Brainly App

Each session includes different content, including the presentation of material in the form of text and video as well as practice questions. The Brainly application displays text or video results on the same screen, not in separate frames or tabs. At the end of each content/learning session, the user then receives a learning success report. Through the report, users can determine the level of their performance and success in each examined material.

1. User Control and Freedom (Navigation)

   There are functions or buttons that enable users to "exit" the system. Users often accidentally select unwanted menus. That's why we need an “Exit” button. However, the authors and designers incorporated the "Exit" button into the Brainly mobile app, given the platform's mobility and the presence of a "Back/Undo" button on mobile devices, alleviating concerns about user errors. If something goes wrong during use, the user can simply press the back button to cancel the process. The interface of the Brainly app is user-friendly and simple to understand. The appropriateness of icons, colors, function settings, and instructions means that users do not need to refer to the manual or get confused looking for app instructions, simply mimicking the behavior according to the information they understand.

   Brainly is a service founded in 2009 by Lukasz Haluch, Michał Borkowski, and Tomasz Kraus. Initially, the service was in Polish and was called Zidane.pl because Brainly was founded in Krakow, a city in Poland. The trio observed a group of students who expressed a desire to assist their peers with homework. This initial motivation led to the development of Brainly, a service designed to facilitate simultaneous use by multiple students. The system should not confuse users by allowing different words, situations, and behaviors to have the same meaning. The consistency of the Brainly app is good; every page has the same design, color, and theme. The title and menu bar are always in the same place. This refers to a standard mobile site that has a simple, minimalist theme and does not use complex graphics.

   a. Error Prevention

      Design that can prevent users from making mistakes is important in a system.

   b. Aesthetic and minimalist design

      It is necessary to pay attention to four principles of display or visual design: contrast, repetition, alignment, and light.

2. Visibility of System Status

   One of the ten classes of user interface design heuristics, Visibility of System Status, aids users in comprehending the operational state of the system. The implementation of Visibility of System Status analyzes visual feedback, describes text information, and employs intuitive design to facilitate users' understanding of all system processes. Figure 2 illustrates the visibility of system status, which describes one of Brainly's functions.

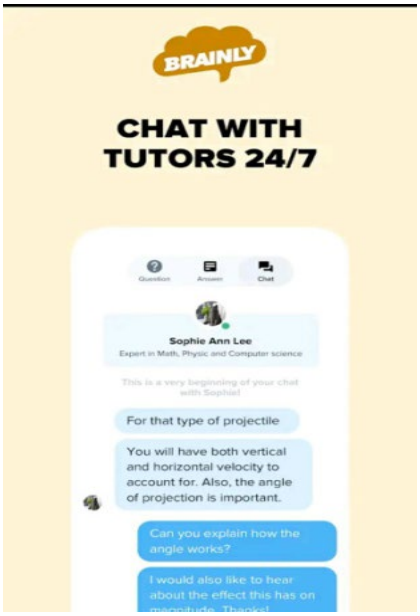

Figure 2. One of Brainly's Features

4.4. Ergonomic Aspects of the Brainly Application

The Brainly application demonstrates several ergonomic features of the GUI:

1. Consistency: Each application screen consistently and appropriately uses icons, fonts, and colors.
2. Simplicity (simplicity): The application design uses icons that are familiar to the user, which makes it easier to operate or implement the application.
3. Human memory limitations: Application systems often limit the amount of information to minimize memory load, providing alerts if there are user operating errors. For instance, the system may issue a warning if the user enters the incorrect password when logging in.
4. Cognitive directness: the use of icons that match the content or warnings provided.
5. Feedback: feedback appears given by the system to the user in every action (for example, loading animation when the system is doing a process that takes time, such as when logging in).
6. System messages: The system provides easy-to-understand error messages by using sentences with standardized words.
7. The Brainly application consistently pays attention to the background and color, aligning with its intended purpose.
8. Display issues: The placement of function icons is easily understood and appropriate, while the use of words is clear or unambiguous.

5. CONCLUSION

The Brainly app interface is user-friendly and easy to understand. The appropriateness of icons, colors, function settings, and instructions means users don't need to refer to the manual or get confused looking for app instructions, simply mimicking the behavior according to the information they understand. Brainly is a service founded in 2009 by Lukasz Haluch, Michał Borkowski, and Tomasz Kraus. Initially, the service was in Polish and was called Zidane.pl because Brainly was founded in Krakow, a city in Poland. The trio observed a group of students who expressed a desire to assist their

peers with their homework or assignments. This initial motivation led to the development of Brainly, a service designed to facilitate simultaneous use by multiple students.

In terms of ergonomics, the Brainly app can fulfill the GUI comfort aspect because of the features available in the program. The compatibility between the system and the displayed graphical user interface makes users comfortable in its learning mode. The placement of icons, error messages, and hints is also easy to understand so that users are not confused. Additionally, the presented screen takes into account the interaction between a person and a computer.

Researchers have gathered data from diverse fields, including human behavior, technology, usability, and ergonomics. Users, particularly students, highly demand this application because it not only facilitates learning in a fun and interesting way through text-based presentations but also incorporates content in other forms, such as videos. Each topic features animations and practice questions. At the conclusion of the learning process, an engaging technique presents a learning outcome report, enabling users to assess their own proficiency in each subject. However, its functionality remains unquestionable, as Brainly is an online learning platform that provides access to experienced private tutors through their learning service.

REFERENCES

Alhaq, Z., Mustopa, A., Mulyatun, S., & Santoso, J. D. (2021). Penerapan Metode Support Vector Machine Untuk Analisis Sentimen Pengguna Twitter. *Journal of Information System Management (JOISM)*, *3*(2), 44–49. https://doi.org/10.24076/joism.2021v3i2.558

Amri. (2016). Komunikasi Dalam Menunjang Terwujudnya Makassar Sebagai " Smart City ." *Jurnal Komunikasi KAREBA*, *5*(2), 431–445.

Anshori Aris Widya, M., Agustiawan, Y., Fibrian, I. D., & Muttaqin, Z. (2016). Upaya peningkatan pelayanan administrasi kependudukan menggunakan teknologi informasi: Rancang bangun sistem informasi di desa sumbermulyo Kecamatan Jogoroto Kabupaten Jombang. *Register: Jurnal Ilmiah Teknologi Sistem Informasi*, *2*(2), 51–59. https://doi.org/10.26594/register.v2i2.547

Cahya Indra Kusuma, R. M. A. (2015). Analisis dan Perancangan Sistem Informasi Pengelolaan Data Pegawai Pada SMAN 1 Sewon. *AMIKOM Yogyakarta*.

Décieux, J. P., Heinen, A., & Willems, H. (2019). Social Media and Its Role in Friendship-driven Interactions among Young People: A Mixed Methods Study. *Young*, *27*(1), 18–31. https://doi.org/10.1177/1103308818755516

Ibrahim, W. H., & Maita, I. (2023). Sistem Informasi Pelayanan Publik Berbasis Web Pada Dinas Pekerjaan Umum Kabupaten Kampar. *Jurnal Ilmiah Rekayasa Dan …*, *3*(2), 17–22.

Marpaung, R. (2017). Analisis Peranan Sistem Informasi Akuntansi dalam Meningkatkan Pengendalian Internal pada Rumah Sakit Bhayangkara Anton Soejarwo. *Universitas Widya Dharma Pontianak*, *4*(1), 9–15.

Romario, M. H., Ihsanto, E., & Kadarina, T. M. (2020). Sistem Hitung dan Klasifikasi Objek dengan Metode Convolutional Neural Network. *Jurnal Teknologi Elektro*, *11*(2), 108. https://doi.org/10.22441/jte.2020.v11i2.007

Sabihaini. (2006). Analisis Pemanfaatan Teknologi Informasi Dan Kinerja Individual (Studi Pada Rumah Sakit Di Yogyakarta). In *Jurnal Widya Manajemen & Akuntansi: Vol. Vol. 6* (Issue No. 1, pp. 1–16).

Sholihatun, S., & Utanto, Y. (2020). Analisa Pemanfaatan Teknologi Informasi dan Komunikasi Sebagai

Media Pembelajaran Anak Usia Dini di Masa Pandemi Covid-19. *Prosiding Seminar Nasional Pascasarjana UNNES*, 730–735.

Utami, S. S. (2010). PENGARUH TEKNOLOGI INFORMASI DALAM PERKEMBANGAN BISNIS Setyaningsih Sri Utami Fakultas Ekonomi Universitas Slamet Riyadi Surakarta. *Jurnal Akuntasi Dan Sistem Teknologi Informasi*, *8*(1), 61–67.