

A Review on M-Learning: (3C) Concept, Component and Characteristic

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Abstract— IT (Information Technology) is opening many paths for developing society. We are currently living in the 21st century and there is a sizable interest in the use of mobile technology in education regions around the globe, also impacting the field of education. Today, every person has a smartphone available among students of all ages. In the race of technology, every person wants the earliest information and that's why M-Learning is becoming such an interesting field that millions of learners and educators across the world can easily access information. The main motto of M-Learning is "Anytime, Anyplace, Anywhere Education".

M-Learning has proved to be very beneficial for all countries. If we look towards education, it is contributing a lot. Today, Education related information is easily accessed through M-Learning. M-Learning acts as an interpreter between educator and learner. The necessities of institutional changes that can facilitate and motivate students and teachers to integrate mobile technology in daily learning. The concept and characteristic of M-Learning based on the new trend-developing technology is discussed in this paper.

Keywords—Learning; Mobile Computing; Mobile Learning;

INTRODUCTION OF MOBILE-LEARNING

Mobile devices are becoming gradually widespread, having already reached over one billion mobile subscribers till now. We have started living in the era of portability. Today's schema, technology influences all sides of human beings including [education, training, health, etc.], but this is a few lists.

Research has given a new direction due to M-Learning and we can develop research and identify for pedagogy from M-Learning. The reality of M-Learning is very vast, we are not to mention its growing application, we are in the anxiety of how mobile technology work whereas we should be known how M-Learning is helpful for learner/educator, what is that concept behind on it and why is M-Learning is so popular in the current schema and why it is so important for researchers and practitioners to get familiar with M-Learning.

This paper tells what M-Learning is and the characteristics which help M-Learning to accelerate it globally.

LITERATURE SURVEY

Mcconatha, D., Praul, M., & Lynch, M. J. (2008)-"Mobile learning in higher education: An empirical assessment of a new educational tool". Praul, M. has shown a study entitled as aims of this study is evaluation of possible method, challenges and potential of implementing this process in college classroom and effect of M-Learning[2]. Result of the study is significant differences were found between control and experiment groups. Research studied and reached the result that students who used mobile scored 5% excess marks compared to student test materials etc. They concluded in this paper that MLA/WAP is more for learning and retrieving information than traditional study.

Banerjee, J., & Bose, I. (2011)-"Higher education through mobile learning. Indian Journal of Commerce & Management Studies". They have shown a study entitled as aims of this paper was to find responders having interest in the M-Learning process of management education, the reason for choosing mobile-based education compared to traditional education [1]. The researcher had found the results of the study that 80% responders are awarded to the M-Learning platform, 78% responders are willing to adopt form learning courses, and 56% will take management courses to responders. He reached the conclusion the researcher said that the level of awareness is very high regarding M-Learning.

Keskin, N. O., & Metcalf, D. (2011)-"The current perspectives, theories and practices of mobile learning". Researchers have shown a Study Entitled as the motto of this paper is how to use mobile learning applications in different fields [3].



Result of the researcher finding a mobile learning application gives different promising approaches in many fields of theories and practices.

Makoe, M. (2012)-“The pedagogy of mobile learning in supporting distance learners”. The researcher has conducted a study entitled as motto is to learn different aspects of theories of mobile learning and cell phone in distance education [4]. It was found by researchers that cell phones can be used as a tool to facilitate full-time learning. Cell phone applications can be used as natural resources for teaching as well as learning. Students can use cell phone social networking such as WhatsApp, Facebook, Twitter, Telegram, etc., and business communication apps such as Slack, Hipchat, Redbooth, Skype, etc., from group study to work collaboratively. Cell phones can also be used for self-assessment quizzes weekly, by this study becomes comfortable and makes students speed up to them.

Grant, M. M., & Barbour, M. K. (2013)-“Mobile teaching and learning in the classroom and online: Case studies in K-12.” They have shown a study entitled as the main motto of this paper is to develop an I-pad for classroom teachers. They talk about the development of K-12 online learning by an M-Learning content management system [5]. And the result of finding is that there is an increase in teacher learning from professional development. There is a higher level of transformation in teachers from the initial stage.

CONCEPT OF LEARNING

Learning concepts is of vast importance in human-being behaviour.

Human beings go on learning from birth till death [23]. “Once you stop learning, you start dying” –Albert Einstein.

The letters of the word “LEARN” have their own meaning.

- **LEARN:** *Let Education Always Remain Natural*
- **LEARN:** *Living Education And Resource Networking*
- **LEARN:** *Living Education And Recreation Network*

Learning is a characteristic program which is normal to all living beings including the two people and creatures. It influences a human's growth. A human learns new propensities just through the way toward learning and through imitated conventions and customs. Scholarly aptitudes are likewise evolved through learning. The ending of good and bad, the ideas of equity and tasteful sense, and so on created through learning. This is a technique of getting the hang of progressing during life.

“Learning without reflection is a waste. Reflection without learning is dangerous”.

THE DEFINITIONS OF LEARNING

Learning is something we do nearly each day like at home, at school, through the internet, at work. Some of these definitions of learning which mean learning are given below.

“A change in human disposition or capability that persists over a period of time and is not simply ascribable to processes of growth.”[13]

“Learning is a fairly permanent change in a person's knowledge or behaviour due to experience.”[14]

“It has been suggested that the term learning defies precise definition because it is put to multiple uses. Learning is used to refer to (1) the acquisition and mastery of what is already known about something, (2) the extension and clarification of the meaning of one's experience, or (3) an organized, intentional process of testing ideas relevant to problems.”[15]

“A persisting change in human performance or performance potential which must come about as a result of the learner's experience and interaction with the world.”[16]

“Learning is a process that occurs within nebulous environments of shifting core elements – not entirely under the control of the individual. Learning (defined as actionable knowledge) can reside outside of ourselves (within an organization or a database), is focused on connecting specialized information sets, and the connections that enable us to learn more are more important than our current state of knowing.”[17]

“We define learning as the transformative process of taking in information that when internalized and mixed with what we have experienced changes what we know and builds on what we do. It's totally constructed on input, process, and reflection. It is what changes us.”[18]

“Acquiring knowledge and skills and having them readily available from memory so you can make sense of future problems and opportunities.”[19]

“A process that leads to change, which occurs as a result of experience and increases the potential of improved performance and future learning.”[20]

“The process of gaining knowledge and expertise.”[21]

“Learning involves strengthening correct responses and weakening incorrect responses. Learning involves adding new information to your memory. Learning involves making sense of the presented material by attending to relevant information, mentally reorganizing it, and connecting it with what you already know.”[22]



MOBILE COMPUTING CONCEPT

Mobile computing is the use of a simply shifted computer like a laptop, tablet, etc., that the user interacts with frequently throughout daily life. This confines the use of mobile computing, hardware, and software. Mobile computers have the potential to include email access and the internet, accessing and editing images, videos, and documents, accessing applications and other programs and playing games. Make it somewhat harder to use than a personal computer, therefore, mobile computing has such drawbacks.

The letters of the word "MOBILE" have their own meaning.

➤ **MOBILE:** *Modified Operation Byte Integration Limited Energy*

Limitations include Internet access is less reliable and slower, energy consumption, lower security that exceeds the potential of batteries, and smaller workspace. One of the most powerful and famous methods of mobile computing are android phones and tablets. And other mobile computing devices include) in day to life.

DEFINITION OF MOBILE-LEARNING

There are several definitions given for mobile learning and mobile technology, M-Learning is a short form of Mobile learning. Mobile Learning is the ability to get or give educational content close to home and expert pocket gadgets for example PDAs, cell phones, etc. Educational content present advanced learning assets which incorporates any type of media made or content accessible on an individual pocket gadget Quinn, C. (2000) explained it prior, as essentially purely learning that happens with the assistance of cell phones, or the convergence of Mobile Computing("the use of little, convenient, and wireless computing(mobile communication) and communication gadgets") and E-Learning("learning encouraged and upheld using information and communications automation") [6].Most of the analysts and coaches/teachers likely view mobile learning as the quick relative of electronic-learning. Pinkwart, N., et al. (2003) for instance, characterizes e-learning as "learning upheld by computerized

"Electronic" apparatuses and media", and by similarity, mobile learning as "E-Learning that utilizes cell phones and wireless

Computing (wireless communication)"[9].Quinn, C. (2010) identifies four 'C' that is Content, Capture, Compute and Communication to analyze the value of mobile technologies for learning [10]. The mobile technology can be used to deliver the content of the topic including multimedia content of the subject. The teacher can use the computing power of the mobile innovation to create recreation and can incite the student for information and afterward processing of the information. The learner can capture information for learning through audio video cameras and other multimedia tools. The communication features of the mobile technology allow the learner to communicate to other learners as well as teachers.

In accordance with this definition, a few creators (e.g., Pehkonen, M., et al. 2003) see cell phones as an inescapable medium that may help us in joining work, study and relaxation time in important ways [8]. Kukulka-Hulme, A., (2005) explained it as any educational arrangement where the sole or predominant advances are handheld or palmtop devices."Cell-phones urge learners to adapt anywhere, anytime on the grounds that they can deliver information inside or outside the lecture halls. The innovations are generally economical and can reach underserved learners with constrained wages [7]. It shows learners social aptitudes that are important for accomplishment in the 21st century. These are little and are typically fit for use inside the learning phases. Mobile automation gives learners a customized instructive encounter in light of the fact that the gadgets can be tweaked and utilized from multiple points of view.

CONCEPT OF MOBILE-LEARNING

In today's digital world, every researcher, organization and institute of mobile learning is giving in their own definition. The same meaning of all these definitions is that which explains mobile learning.

The core of M-Learning is the mobile device provides such a facility through which you can effectively expand your learning. Mobile learning completely depends on mobile technology whether it is to learn or deliver something. Based on these definitions, the core concept has come out, whose mobile learning is breathing under, and that is portability. The fundamental of portability is embedded in m-learning. That is explained very well in the form of a table.

Table 1: Various Properties of M-Learning

Properties	Representation
Physical	Learning can take place anytime and anywhere.
Technology	Using portable or personal pocket gadgets to access and store assets.

Ideational	Learning materials are maintained, arranged and administered using certain applications with the goal that clients can safe zone into the required information.
Social	Participating in social communication groups.
Learning dispersion	Through learning to allow expanding across several contexts in short.

COMPONENTS OF MOBILE-LEARNING

The common components of mobile learning are learner, teacher, environment, content, and assessment. Figure displays the common components of an effective mobile learning approach. The basic components are described below:

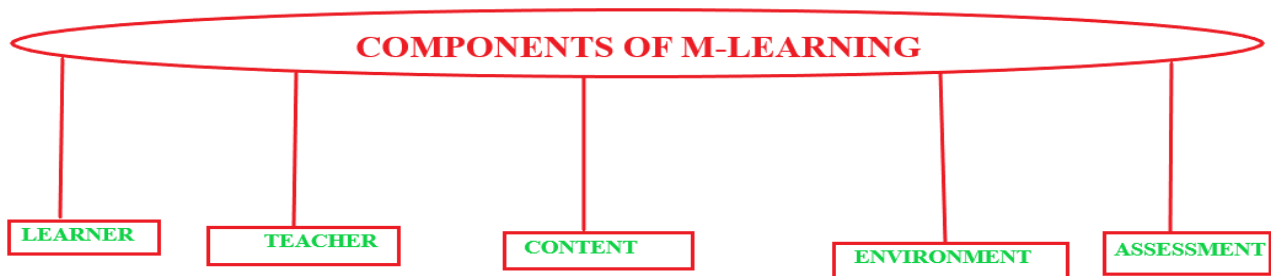


Figure 1: Component-mobile learning

1. **Learner:** A person who is learning a subject or skill. The term learner as a synonym for the student. According to new education approaches, learners are in the middle between teaching and learning activities. The rest of the components serve the learner. Mobile learning builds the activity on learner's subjects of interests, skills, experiences, and needs. The learner plays the role as active from the determination of the goals till the evaluation stage. Role of learner are giving below:

- Learning is Ultimately the Learner's Responsibility
- To learn, Willing to Grow, to Experience
- Growth Involves the whole Learner
- Growth Requires looking for continuing Feedback
- Growth Involves Pragmatic outlook
- Believe Your Instincts to learn
- Learners are always questioning
- Learners follow understanding attentively
- Learners be familiar with that a lot of learning is not cool
- Learners make awareness their own
- Learners never run further than questions
- Learners share what they have educated

2. **Teacher:** The ways towards going to a person's requirements, encounters, and principal so that they do learn each thing, and go beyond the given and that person who processed teaching is known as a teacher. A teacher is a human who helps students to acquire knowledge, competence or virtue. The teacher is also called a school teacher or, in some contexts, an educator. A teacher not only teaches but inspires and encourages students by which they do best in their area. In mobile learning Books and other media components store information and teachers put it into words to students in conventional learning environments. On the other side, recently using technology to store information, those are supporting more easy to get (reachable) information for students. There are several roles of the teacher in mobile learning as given below:

- Providing better facilities for learning in the lecture hall and online environments
- Productively utilizing digital media tools to enhance the potential of students/learners
- Working with students/learners and help them to clutch new learning opportunities and technologies
- As regular update using global education platform perfectly
- Acting as a mentor/supervisor and along with teaching and learning is also addressing the social and emotional issues of the students/learners
- If there is a problem in learning, then be ready for change
- Learning mediator



- Designer of learning programmes, material
- 3. Content-** In the field of education, content takes a stand as information and knowledge. The teachers and learners expect to learn. It depends on the specific field of the learner. Such as mathematics, science, art, etc. The contents are based on the principals, concepts, theories, and facts which motivates the learner and trainer for the specific course. For example, reading an article or writing any research, etc. Some facts about accessing online content are as follows:
- A. Content should be small:** The more factual the content is the more automatic the content will be. Mobile learning allows the user to access each of their content. For example, download-upload, emailing, posting on Facebook, fetching attachments, buffering video on YouTube, or preparing any curriculum. Mobile learning contributes to all of these things and mobile must be ready for all things.
- B. Content should be searchable:** Learner nowadays tries to think that information is on his finger and that too without any hindrance. Nowadays, the patience of a person to sit in front of the desktop for hours is quite less, just only searching for information. All the organization needs to pay attention to is that information should be true, searchable, and context-based.
- C. Content should be responsive:** Content should be responsive that means the interface of the device using the information in the response is responsive for example, computers, mobiles, laptops, etc. It should be adaptable & content should manage according to the device such as the size of the screen, scale of content states, etc.
- 4. Environment:** Today's learning environment has changed enough. The learners should have an innovative and creative environment that attracts motivation for their studies. The learners search for such types of environment that are not outdated as expressly highly to support thinking in the form of engineered. Learners prefer a learning environment that can change their strategies and teaching as well as shove their learning capabilities. Learners want to become a part of such an effect on the environment which gives a sense of accomplishment that is friendly and interactive for both learners and educators. There should be a secure and positive synergy between learner and educator. In reference to the same students who feel that the environment and platform provided is good, then they volunteer to take the risk of questioning, and feel interested. The environment should be designed in such a way that it gets a positive learning experience. The environment should be such that it can easily reach the student information. Students that study online should have access to every unit such as assignments, results, and relevant resources. The students or learners access resources through mobile. This means that with mobile learning, learners can access their contents as well. Today, there is a need for such an environment that can increase student-student, student-teacher, and teacher-teacher interactions and thus M-Learning environment enhances education to every individual respectively.
- 5. Assessment:** Assessment is always an important part of an educational process whether it is offline or online and it is a systematic process to measure knowledge, skills, attitudes, and beliefs of learners. In the direction of learning, teachers make the path of the students to be better. Assessment is a very critical component regarding mobile learning. The understanding of assessment regarding mobile learning is very important in digital life today because accessing information is very easy and educators became knowledge-guide from knowledge-barrier. Mobile technology plays a good role in mobile-learning. These technologies can assess records and reports of learner performance from an educator. So, learners' evaluations must be made through the database logs, software packages, online exams, chat rooms, discussion boards, and online quizzes for improving learner quality. Assessment helps in solving the problem of the learner which is based on the course. The high-quality features play very important for the learner after they take the course along with assessment. The results of our assessment help the students to grow and work on their weak areas.

CHARACTERISTICS OF MOBILE-LEARNING

- 1. Spontaneous:** Mobile learning is more intuitive than others because mobile learning can happen anywhere and anytime that is perhaps the most significant characteristic of mobile learning. In other contexts, it is more flexible and portable. Mobile learning is context/material, meaning that learners can learn anytime and anywhere. This learning means that users proactively direct their learning. Generally, learning can be conducted over discrete contexts and environments. Wireless technologies such as laptops, computers, tablets, and cell-phones are revolutionizing education and transforming the traditional lecture-based learning which is supported by teaching into anytime and anywhere in education.
- 2. Portable:** The resources can be handily carriable and moveable from one place to another place. In sequence to become portability, the devices are typically designed to fit pocket-sized and become light-weighted. This characteristic enables users to easily carry out the devices as they travel from place to place. The capacity of storage in the devices allows almost all information to be stored in the gadgets. As a device coupled to a user, they can access information anytime, anywhere from pocket devices during learning activities.
- 3. Interactive:** The content should be well-structured in the appropriate fashion so that users can handily web surfing (internet surfing) the essential information. The environments of mobile learning which develop the latest technologies to bring a collaborative learning environment setup into learning and teaching activities (Uzunboylu et al., 2009) [11]. The interaction design of m-learning is vital for remote users to interconnect rhythmically with the educators, resources of learning and other clients inside the environments. Users are not inactive when using the functions of devices



and environments and permit various levels of interconnectivity. At that time when designing interactive mobile learning applications then the functionality, performance, and usability should be considered in the first place. Taylor, J., et al. (2005) pointed out that the layers of technology represent learning as a connection with technology, in which tools such as mobile phones and computers function as collaborative negotiators in the process of coming to know [12].

4. Private/Privacy: Mobile learning is a private approach. Users take privacy from mobile learning. It means that only one assessor can browse the information at a time via a portable device. With this quality, the primary priority is given to the authoritative mobile users to independently access the information compared to others.

5. Collaboration: The collaboration is done between educators and students through mobile learning. Mobile learning also can be used to create collaboration among all learners. So, devices may be used for collaborative learning activities in education. Today's mobile technologies are extensively used for social communication. For that reason, users can effortlessly communicate to the groups or individuals.

6. Instant information: Nowadays, using a mobile device is all about speediness. Accordingly, for running scenarios to specific questions the need is for speedy answers. Users browse the information in the form of text, graphics, audio, video, and simulation in mobile learning. Instant information is definitions, properties, formulas, and equations, etc. Learning material should reflect this requirement by providing materials. This characteristic enables a learner to rapidly zone into information. In the academic interaction and user's satisfaction "quick response time" is an important factor.

7. Connectivity: In the respect of technologies connectivity refers to how devices can connect wirelessly using a wide range of cellular and wireless access technologies such as GPS, GPRS, GSM, 3Gs, 4Gs, Wi-Fi, WLAN, etc. Connectivity of mobile is using voice telephony and accessing the internet for data transmission. Internet access is the ability of individuals, organizations, and institutes to connect to the internet using computers and other devices. The technologies of network access work as a medium between users, mobile devices and learning resources. The devices must be capable of getting connected through the internet anytime, anywhere.

8. Control: In this, it refers to the clutch a teacher and a learner has on the learning process for stability, continuity, and outcome. It is very important to prominence the role of the moderator who mediates the learning process when designing mobile learning environments. Because it controls to a certain extent and creates a learning environment which provides good nourishment to learners with guided reflection; otherwise, learners may be at risk of losing good direction. As a foundation for a mobile learning environment, the authentic learning where students are skilled to resolve real-time complex problems and by reflection create new knowledge, at times guided by mentors. By providing an environment of mobile learning both are a fully supervisor-controlled learning scenario to a fully learner-controlled learning scenario. When designing environments of mobile learning, it is quite critical to decide how independent a learner must be so that the best learning results can be achieved. As a result, it is most vital to reflect on the levels.

9. Blended: Blended learning is a combination of several types of learning such as m-learning, e-learning, face-to-face learning, and contextual-learning. It is used by both teachers and students from different perspectives in the area of education. The devices enables learning in terms of resources available on mobile tools and a count of learning activities that a learner can act upon like as "concept-mapping, organization, note-taking, writing, researching, reading electronics documents, watching animations, movies, interacting with automations, simulations and multimedia educational contents, programming on worksheets and submit them for checking and correction, drawing graphs, calculating mathematical problems, data collections, doing their homework, keeping a reflective logs, and undertaking records(audio or video)".

10. Usability: This is related to using portable devices for learning objectives with respect to , battery-life, screen-size, weight, processing-power, storage, user-friendly applications, and user-interface. The usability features of mobile devices provide a usability guidelines framework for designing mobile learning portals which focuses on analyzing the learner's usage skills, human-mobile interaction, and interface design. This is the main category to develop usability guidelines for designing mobile learning portals containing mobile learning content and applications. Therefore, mobile devices are becoming multi-purpose and more sophisticated in design and functionality.

11. Technical Support: Making mobile learning a flawless learning opportunity is not possible without technical support for teachers and students. If teachers/trainers are digital immigrants and must redesign courses for mobile learning, they would need quite a lot of support to make the content bite-sized. More than the instructional design support, they would require technical support if they can face any problems with maintaining and uploading mobile learning materials. In other cases, if learners face any problems in browsing and downloading technical support, learning resources could be a rapid need. The implementations of Mobile learning at different levels of education such as schools, colleges, universities and other distance learning courses required wide-ranging technical hold up to make the mobile learning implementation victorious and dependable.

ADVANTAGES AND DISADVANTAGES OF MOBILE-LEARNING

M-learning is a wide-ranging name used to mention any teaching and learning equipment that happens with the use of mobile gadgets and platforms. The devices of m-learning would take account of electronic gadgets such as pocket devices, smart phones, laptops, and tablets, etc. Platforms are regularly being developed for m-learning devices from video players to platforms that allow all-inclusive accessibility, messaging services that keep trainers and students connected, etc. It promises to be an astounding addition to the L&D educational ecosystem.

Everything in the world should be in balance; it means that everything has its advantages and disadvantages. But, it's not all good, mobile learning does have its pros and cons.

1. Learner's flexibility: The word flexibility is not restricted to any one place. Mobile learning provides enormous flexibility for learners to choose the device. They wish to learn on when they want to learn and most conspicuously at the momentum they can consume and assimilate. Flexibility in mobile learning involves learning using pocket devices, videos, podcasts, and more other well-liked multimedia assets on smartphones.

2. Completion rates and retention: The content which presented in the mobile platform is chunk-sized and succinct. The flexibility offered by the bite-sized m-learning content is vast, as it enables learners to complete courses and initiate the next course as well as. Eventually, this factuality leads to the seamless, successful mobile learning user experience.

3. Multi-device reinforces: The important profits of m-learning in education fields is that of supporting multimedia. Under the m-learning environment, the same course and curriculum is obtainable on several devices ranging from PCs, laptops, Android phones, and tablets.

4. Performance reinforces: At the present time, learners select methodologies that are as inconspicuous to their life as probable. Generating a learning practice that yields a high standard of growth. It also facilitates accessing information easily while at job and this portion here is maybe one of the biggest benefits of m-learning education. When learners are capable of searching and retrieving information on one click effortlessly using their personal pocket devices, this facilitates their global learning knowledge.

5. Learning path: Mobile learning gives a platform to learners and educators. Mobile-based organizers are to integrate with mobile learning platforms. The learners get underway updates and notifications on their course and curriculum, which they check anytime and anywhere as well as resume their course and curriculum effortlessly without prior content. It is established as an m-learning platform that is more individualized and nonstop.

6. Higher engagement: Micro-learning has changed the format of training delivery. Extant research and statistics disclose the rate of higher engagement when courses are delivered using the mobile format. Offers are that of personalization, which gives the sense of commitment and inspiration of the customers. It is increasingly used to offer both formal training and a portion of the ecosystem to encourage informal learning. Micro-learning chunks can be optimally consumed on mobile devices. Correspondingly, you can integrate mobile Apps for learning in your whole strategy. Furthermore, the fact that mo-learning is reachable anytime, anywhere by customers. To help learners stay on path with their training which results in fewer dropouts?

CONCLUSIONS

However, Mobile Learning gives a vital role in the area of modern education in daily life. M-Learning encourages both teachers and students to take personal responsibility for their learning. The teacher builds self-knowledge and feels more confident in it. Knowledge of teacher education through M-Learning will improve knowledge through the process. This will make the teacher's/pedagogue's/instructor's global standard. M-Learning is very favorable for education, corruption and all kinds of learners/educators. The main study raised in the paper is element and characteristics. The paper ensured that M-Learning makes education interactive and in the end, some advantages and disadvantages are also there to impact due to excess usage of mobile learning.

Future studies of this paper can investigate:

- Security and privacy.
- How to use it.
- Technology works.
- Application of real life.

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