A STUDY ON DIGITAL COMMUNICATION SYSTEMS AND THEIR MODERN APPLICATIONS

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ABSTRACT

This article offers a research tool for comparative studies of digital communication systems. It brings together the fields of infrastructure studies, Internet governance, and political economy of the Internet with the tradition of systemic media analysis and argues that existing frameworks are inadequate for capturing regulatory and power structures in a complex digital environment. In the article, we develop a framework for conceptualising and mapping the components of digital communication systems – the DCS framework – and operationalise it for standardised measurements by outlining twelve key indicators that can be analysed using empirical data from a number of existing databases. The framework provides a basis for measuring and comparing digital communication systems across national or regional contexts, and thereby developing new typologies for how to understand structural differences and similarities. Digital communication essentially refers to the use of digital devices to send information electronically. It is the way in which people communicate through a digital medium. It is a means of communicating in the digital age. It involves the use of online tools like email, text messaging or social media to share a message with others. Most organizations today use a variety of digital communication channels to connect employees, customers, and other stakeholders. The digital communications field is ever-expanding with new career opportunities. The constant development of digital tools leads to opportunities for digital communication specialists. This paper provides an overview on digital communications.

Keywords: *digital communication system, infrastructure, digital technology, digital communication, wireless communication*

INTRODUCTION

It should be realized that digital innovations and increasing transmission efficiencies are simply picking up speed with age. A new digital communications technology has emerged. An electronic superhighway is beginning to girdle the globe as voice; video and data converge, bringing in their wake a new basket of digital, multimedia and interactive communication technologies. The world's media, telecommunications and information technology industries are undergoing a period of unprecedented and profound change. Dramatic technological advances combined with market liberalisation and globalization have together engendered the .digital revolution. A dramatic consequence of this is convergence, a ubiquitous but loosely defined term commonly understood to denote the blurring of boundaries between the media, telecoms and information technology sectors. There is broad consensus between academics and practitioners that technological advances are bringing these sectors closer together and have the potential to transform them entirely. It is because notification, computerization, and digitalization all increase choices. media business throughout the world. The tremendous acceleration towards convergence of communication and internet is brining the advancement of digital communication to its extreme capacity. Convergence does not necessarily sound the death knell of age-old technologies. In fact, it leaves enough room for many technologies to co-exist and one will not replace the other outright. This is because no one technology can meet all the requirements of the market-place. Hence, each technology will find its niche and

redefine new and old classes of service and user terminals. In this context one can safely assume that there will be a rash of new user terminals that will let us communicate in ways we dream. The course of "digital communication" is quite difficult and faces the following challenges. First of all, the course needs solid theoretical foundation. To be specific, it is based on matrix theory, probability theory and other mathematical theories, where complex and abstract mathematical derivations are involved, making it difficult for students to learn. Secondly, the course requires a large number of prior courses such as digital circuits, signals and systems, digital signal processing, and communication principles. In the class, it is often needed to recall the contents of these prior courses. Finally, the course is closely related to the practical application of software and hardware systems such as mobile phones. Nevertheless, the theoretical content in the textbook is quite abstract and different with the communication devices. The above problems reduce the effectiveness of teaching and cannot meet the skill needed for students when they are employed. Therefore, it is of great importance to conduct research on the teaching and practice of digital communication. In order to meet the requirements of cultivating talents with solid theory and strong practical ability, we make propose to reform the course in terms of teaching content, training methods and evalatuion methods. Based on the experience in teaching prior theorical courses such as signal and system, communication principle, our new attemptes can guide students to practice training, and thus imporves their skills in dealing with practical problems, which will lay a solid foundation for becoming qualified professional and technical talents.

LITERATURE REVIEW

Deveshree Bhojane (2019) Digital Communication has proliferated in a big way in the previous years. Digital Communication plays a vital role in today's electronic world. Digital Communication can be done over large distances through internet and other things. Communication technology that intimidated many of us just a few years ago is now a part of everyday life. In addition to changing our daily lives, the transformation in digital communication also raises important economic, public policy and societal questions. Digital communication is one of the most commonly used modes of communication nowadays. The objective of this paper is to understand the key modules of digital communication systems with emphasis on digital modulation techniques. The research will conduct a descriptive approach in doing so the use of journal articles, relevant newspapers and blogs will be used for gathering evidence. Access to the internet today by individuals, businesses and institutions alike has created a global market for internet service and has spurned an increase in productivity in the technological communication field.

V. Sugadev (2018) Communication in the whole of the World is revolutionized with the advent of Satellites. Satellite Communication has served mankind in many ways e.g. to predict weather, storm warning, provide wide range of communication services in the field of relaying television programs, digital data for a multitudes of business services and

most recent in telephony and mobile communication. It may not surprise world community, if satellite communication links may be used for voice and fax transmission to Aircraft on International routes in near future. GPS Navigation, Global telephony, Multimedia video and internet connectivity, Earth Imaging through Remote sensing satellites for resource monitoring, Telemedicine, Tele-education services etc. are other feathers in Satellite communication applications. Satellite communication system has entered transition from point-to-point high cost, high capacity trunks communication to multipoint to-multipoint communication with low cost. Satellite Communication has moved in many steps ahead like frequency reuse, interconnecting many ground terminals spread over the world, concept of multiple spot beam communications, Laser beam based communication through satellites and use of networks of small satellites in low earth orbit. In this paper satellite communication advancement, different application aspect present and future is discussed. Satellite communication has many application and market if we can pool our resources, come up with innovative and low cost solutions for world community.

Stuti Ramola (2014) Usage of the benefits of electrical communication has become an inseparable part of our lives now. Through this paper, I have tried to summarize various technologies that are important in the field of digital communication and have also included the recent advancements in the same field. The paper starts with the basic idea about the communication system followed by basic modulation techniques like amplitude, frequency and phase modulation. It then covers the problems of occurrence of noise and error in various modulation systems and the methods of reducing it like coding for error detection and correction. Lastly, the various latest advancements in the field of digital communication have been discussed for instance the new graphene technology that has the potential to break the current speed limits in digital communication as demonstrated by the scientists at the University of California, the advancements in underwater acoustic digital communication as per the paper published in IEEE in the oceanic engineering and recent developments using Phase Shift Keying on High Frequency.

Ojo Titiloye Oyeyinka (2013) The study examines the application of modern communication on technology. It assesses the impacts of new technology and its effectiveness on media operations. The paper explores secondary sources in its data collections and it found that the new media are not independent rather emerged gradually from the metamorphosis of older media and are purposefully invented to enhance or strengthen their outputs .It also discovered that the new technology has facilitated a wider spectrum of media coverage with ease, otherwise turning the whole world to a "global Village" The study concludes that though the older media are gradually getting out of vogue ,they remain the stepping stones and pushbuttons for the new emerging technological innovations. The study, therefore, recommends that media practitioners should strive tirelessly to train themselves on the new media and that government and private investors should invest heavily on

modern technology for accessibility and productivity amongst others.

Vineet Kaul (2012) We are living at the crest of a communications revolution. Digital communications and computers are having a tremendous impact on the world today. This article studies different aspects of communication systems by covering some basic ideas, approaches, and methodologies and gauges the degree of the current state of digital communication studies together with its research into mass communication. This article explains the rationale for the digitization and analyses the new ways of producing communication, the characteristics of digital communication products and the consumption processes that they activate. Finally, an analysis is done of the methodology and technology used in the creation of the multimedia version of the exhibition, and the complexities of the fields of knowledge that are fundamental for constructing a Theory of Digital Communication (TDC). Digitization is creating a second economy that's vast, automatic, and invisible—thereby bringing the biggest change since the Industrial Revolution. This article concludes with a Theory of Digital Communication that should resolve, from defining the study aims and the most pertinent methodologies with the closest fields of knowledge with which to establish strong epistemological relationships.

Comparison Between Analog And Digital Communications

A side-by-side comparison of analog and digital communications highlights their unique characteristics and applications. Analog communications are characterized by continuous signal transmission, which makes them ideal for natural signal representation but prone to noise. On the other hand, digital communications utilize discrete signals that are highly resistant to noise and offer better efficiency, albeit at the cost of complexity. Analog and digital communications represent two distinct paradigms for transmitting information. A detailed comparison helps highlight their unique characteristics, advantages, and limitations, shedding light on their suitability for different applications.

Applications of Digital Communications

Digital communication is being used more and more as technology advances. Businesses, organizations, industries, and government all use digital communications. The following are typical applications of digital communication. E-Commerce: Today, most businesses use a range of online channels to connect with customers, employees, and stakeholders. Communication is at the heart of e-commerce. Businesses long for customers to visit their portals. E Commerce stores can benefit from using live chat, chat bots, or social media to chat with consumers or resolve their problems. Consumer communication preferences are rapidly changing as consumers look for immediate responses via social media, apps, live chat, and other digital communication channels. Consumers (majority of them are digital natives) are looking for faster, more efficient, and automated responses via chat bots, intelligent voice assistants, As a result, businesses that provide several options are gaining a competitive advantage over others Communicating in the digital workplace is an integral component of any modern organization.

Theory of Digital Communication

Communication and information theory are the theories of modern digital communication systems, where "digital" means that we are transmitting information as symbols (or numbers) from a finite alphabet (or limited set of numbers). Although physical signals are continuous waveforms in time, the principles of communication theory, allows us to consider the continuous waveforms we are transmitting and receiving over a noisy and interfering communication channel (a telephone cable or the radio waves propagation of a mobile phone antenna) as a digital system, randomly perturbing the information that we are transmitting At that time a large number of readers and anthologies examined the new technological situation from a wide range of epistemological and theoretical angles. As a whole, new media studies are characterized by an exceptional openness towards theory and method and up until now it seemed impossible to discern any obvious canon guiding research decisions in the field.

Digital Communication Revolution

Today, the digital communications revolution is also changing the social landscape, with the power to free millions of people from the marginalization that comes from having no voice in global affairs. Power now rests with the people – and people now expect to be heard as a right. The world's media, telecommunications and information technology industries are undergoing a period of profound change. A cocktail of closely interrelated developments including the exponential growth of the internet and World Wide Web, digitisation, dramatic reductions in the cost of computing power, deregulation and market de-regulation has triggered the so-called .digital revolution. For some time, scholars, educators, policymakers and parents have been debating the implications of media and digital technology for literacy, attention span, social tolerance, and propensity for aggression, among other concerns. This communications tsunami is rolling our way and many of us are not sure what to do. We see the tide going out fast and far. But standing on the beach and waiting for it to roar back in is not an option.

METHODOLOGY

As the study suggested a conceptual research framework to address the role of digital communication on developing the administrative works as well the perceived communication effectiveness and usefulness in a situation of university staff use communication technologies for messaging during the digital communication medium for interaction effectiveness and collaboration purpose. Suppose that the higher education institutions who are satisfied with using digital communication could perceive communication effectiveness for developing their administrative work. It is hypothesized that a higher level of compresence can support a higher level of administrative work that could eventually result in a high perceived outcome of communication effectiveness. They are selected and participated in this study randomly, and they are asked to give their experience and perceptions over past periods while using different types of digital communication mediums to complete their administrative works. The study procedure includes that all samples represent different institution departments

at large public universities in Jordan. They were asked to complete a questionnaire that assesses the digital communication with self-co presence, partner- self-co presence, communication effectiveness, and administrative work development.

RESULTS AND DISCUSSIONS

The study's conclusions show a substantial discrepancy among digital marketing communication's efficiency and its impact on factors which impact decision-making. This indicates that the target audience's decision making procedures are significantly impacted by the manner digital marketing communications are conveyed. The research indicates that if digital marketing communication is implemented well, it can have a favourable impact on aspects that drive decision-making. Consumer attitudes, preferences, perceptions, intentions, and behaviours about the goods, services, or messages distributed via digital marketing platforms are some of those elements.

Table 1. Rely on online digital communication channels

Rely on online digital communication channels							
Crosstab							
		Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**Total**
Gender	Male	1	7	46	33	1	88
	Female	6	5	26	19	4	60
	Male		7	12	72	52	5	148
Total							

According to the research findings, companies or organisations can use the power of successful digital marketing communication to influence decision-making elements in a way that will improve the outcomes of their messaging, products, or services. The efficiency of marketing strategies can be improved overall and a greater understanding of the mechanisms via which digital marketing effects decision-making can be attained with constant study and evaluation. Thus, the null hypothesis is disproved. The respondents' gender and their level of trust in the digital communication channel do not significantly correlate.

Table 2. Chi-square test

Table 9. Chi-square test			
	Value	**df**	**Asymptotic significance (2-sided)**
Pearson Chi-Square	10,094a	4	0,039
Likelihood Ratio	10,341	4	0,035
Linear-by-Linear Association	0,843	1	0,359
N of Valid Cases	148		
a. 5 cells (50,0 %) have an expected count of less than 5. The minimum expected count is 2,03.			

The study's conclusions show a strong correlation between respondents' gender

and the dependability of digital communication channels. This indicates that there are notable differences among male and female respondents' perceptions of the dependability of digital communication channels. The statistically important correlation indicates noteworthy distinctions between the perceptions of male and female persons about the reliability and credibility of data obtained via digital communication channels. When creating methods for communicating and transmitting data via digital channels, it is crucial to take gender-specific preferences and perceptions into account. This is demonstrated by the strong correlation found among the respondents' gender and the dependability of digital communication channels. Understanding these differences can help improve the effectiveness of communication and engagement with diverse audiences. Hence null hypothesis is rejected.

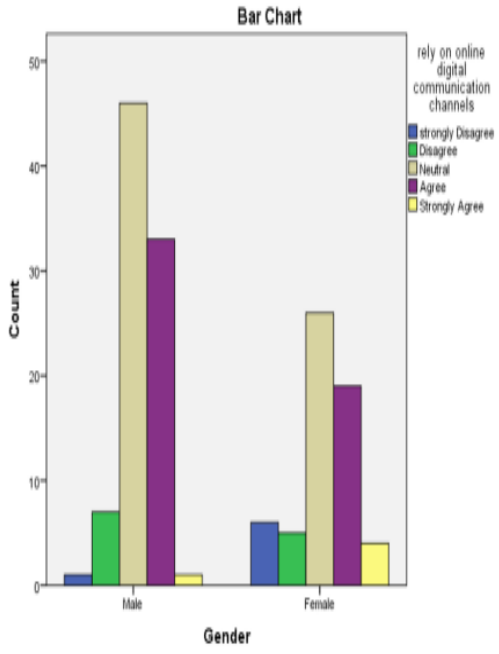

Figure 1. Rely on online digital communication channels correlation

CONCLUSION

The digital age has changed the way we interact and communicate. Digital communication is just one aspect of the huge acceleration of digital transformation initiatives. The digitalization transformation has begun and every organization should embrace it fully. With communication increasingly becoming digitized, organizations in the private and public sectors are looking for talented professionals with a solid background in digital communication. Digital communications have played pivotal roles in shaping the modern world. They excelled in natural signal representation, making them ideal for applications like traditional radio, television, and telephony. However, their susceptibility to noise, limited scalability, and inefficiency over long distances highlighted the need for a more robust alternative. Digital communications emerged as the solution, leveraging discrete signals to deliver superior noise resistance, efficiency, and scalability. With applications ranging from the internet to mobile networks, digital systems have become the backbone of modern connectivity. They enable seamless integration with computing technologies, robust error correction, and high-speed data transmission, overcoming the limitations of analog systems Understanding both analog and digital communications is crucial for appreciating their unique contributions and harnessing their potential to meet the growing demands of an interconnected and dynamic world. These innovations promise to redefine how people connect, collaborate, and interact with the world.

REFERENCES

1. *Vineet Kaul (2012), "The Digital Communications Revolution", Online Journal of Communication and Media*

Technologies", Online Journal of Communication and Media Technologies, ISSN: 1986-3497,Volume.2,Issue.3

2. *Stuti Ramola (2014), "Digital Communication-Technology and Advancements", Advance in Electronic and Electric Engineering. ISSN:2231-1297,Volume.4,Issue.4,pp. 367-374*
3. *V. Sugadev (2018), "Issues, Challenges and its Future Application of Satellite Communication System", International Journal of Engineering Research & Technology,ISSN: 2278-0181,Volume.06,Issue.14*
4. *Deveshree Bhojane (2019), "Role Of Digital Communication", Journal of Emerging Technologies and Innovative Research, ISSN-2349-5162, Volume. 6, Issue.4*
5. *Ojo Titiloye Oyeyinka (2013), "Application Of Modern Communication On Technology", International Journal Of Innovative Research & Development, ISSN: 2278 – 0211,Vol.2,Issue.11*
6. *Bhargav Appasani (2018), "A Review on Synchrophasor Communication System: Communication Technologies, Standards and Applications", Protection and Control of Modern Power Systems, ISSN: 2367-0983, Volume. 3,Issue.4*
7. *Chao Luo (2013), "Chaos Generated From The Fractional-Order Complex Chen System And Its Application To Digital Secure Communication", International Journal of Modern Physics,ISSN:1793-656X,Vol.24,Issue.04*
8. *Kate Grudpan (2015), "Applications of everyday IT and communications devices in modern analytical chemistry: A review",Talanta, ISSN: 1873-3573 Volume.136,Pages 84-94*
9. *Ioannis Krikidis (2014), "Simultaneous wireless information and power transfer in modern communication systems", IEEE Communications Magazine, ISSN 1558-1896,Volume.52,Issue.11*
10. *Emilio Ancillotti (2013), "The role of communication systems in smart grids: Architectures, technical solutions and research challenges", Computer Communications, ISSN: 1873-703X,Volume.36,Issues.17–18*