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Advising and Counseling System

Highlights

WhatsApp in Academic Writing

Employability Skills in Polytechnic

Discovering Thoughts, Inventing Future

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A Smart Baby Cradle

By Savathri Ramesh Associate Professor, Syed Abrar Associate Professor, Hanidia Misbah SS, D Padma Bhavani, Mamtha H.L & Madhushree

HKBK College of Engineering Karnataka

Abstract- A small baby needs parents' attention for whole day and 7 days a week, which is impossible due to other priorities like house hold activities, official works and personal works. Day care centre or nanny is the two options available which involves lot of passion. We all live in a world where technologies are sournded all around us. The new generations of parents were raised up with this amazing technology. There are lots of things or items present on these earth that parents will buy to help them care for their baby (Cradle, Crib, Baby Monitor, etc.). So, there is a need for safe and secure place to take good care of the children's need with minimum human intervention and care, which can be accomplished with the help of a "Smart Baby Cradle". A "Smart Baby Cradle" provides parents a smart automatic cradle system which help these parents monitor and comfort the baby. The Smart Baby Cradle allows them to monitoring their babies, the cradle, play soothing music, even speak to the baby, observing the temperature of the infant, bed wet sensor which will caution the attendants for bunk wetting of the infant. The mother where so ever she is can have a look on the baby through camera inserted in the cradle. All the fittings are done through Arduino and PIR sensor. Additionally, we provide a predefined nutrition food chart to help baby remain healthy.

Keywords: *baby cradle, crib, baby monitor.*

GJCST-G Classification: *I.2.1*

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A Smart Baby Cradle

Savathri Ramesh Associate Professor [α], Syed Abrar Associate Professor [σ], Hanidia Misbah SS [ρ], D Padma Bhavani [ω], Mamtha H.L [¥] & Madhushree [§]

Abstract- A small baby needs parents' attention for whole day and 7 days a week, which is impossible due to other priorities like house hold activities, official works and personal works. Day care centre or nanny is the two options available which involves lot of passion. We all live in a world where technologies are sournded all around us. The new generations of parents were raised up with this amazing technology. There are lots of things or items present on these earth that parents will buy to help them care for their baby (Cradle, Crib, Baby Monitor, etc.). So, there is a need for safe and secure place to take good care of the children's need with minimum human intervention and care, which can be accomplished with the help of a "Smart Baby Cradle". A "Smart Baby Cradle" provides parents a smart automatic cradle system which help these parents monitor and comfort the baby. The Smart Baby Cradle allows them to monitoring their babies, the cradle, play soothing music, even speak to the baby, observing the temperature of the infant, bed wet sensor which will caution the attendants for bunk wetting of the infant. The mother where so ever she is can have a look on the baby through camera inserted in the cradle. All the fittings are done through Arduino and PIR sensor. Additionally, we provide a predefined nutrition food chart to help baby remain healthy.

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I. Introduction

Generally, the baby cradle is used for to make sleep and soothe to baby. For example someone have to take care of their child till as they asleep. However, conventional cradle does not electronically equipped such like battery or adapter to automate the cradle automatically. In Addition to that, these kind of conventional cradle is used in villages areas or non developed cities due to its low prices. But the problem of this kind of designated cradle is that you need manpower to take care of your child and your child may not be safe and feel comfortable in the conventional cradle. Thus, we need automatic cradle to take care of child which uses the battery or power source. Besides, there are extra features or function is provided by the newly automatic cradle is beneficial for parents. Because in the present world people are very busy in their professional life so they do not get time to take care of their infants. It will be very difficult control the babies and if someone is hiring professional to take care of their infants. It may increase your expenses from monthly expenditure. Moreover, in today, life it is very hard to even for the home makers (mummy) to sit nearby their babies and sooth them whenever they feel uncomfortable. Though, automatic this application is very useful for the nurses maternity units of hospital. In this project we had made cradle to swing/oscillate without human Intervention /Automatic by the sensor which is actuated by movement or specific action done by the body. It will also contain a sound system or alert arm for the parent as an indication of that baby has waked up if they are away from the baby and in other room. Smart cradle could be a device that pro vides associate aid to swing the baby cradle automatically. This system aims at two main things in assisting parents. Smart cradle movement informs parents when necessary.

II. Literature Survey

1) R. Cohen and Y. Lavner, "Infant Cry Analysis and Detection," in Electrical & amp; Electronics Engineers in Israel (IEEEI), 2012 IEEE 27th Convention of. IEEE, 2012, pp. 1 5. In this paper we propose an algorithm for automatic detection of an infant cry. A particular application of this algorithm is the identification of a physical danger to babies, such as situations in which parents leave their children in vehicles. The proposed algorithm is based on two main stages. The first stage involves feature extraction, in which pitch related parameters, MFC (melfrequency cepstrum) coefficients and short time energy parameters are extracted from the signal. In the second stage, the signal is classified using the kNN algorithm and is later verified as a cry signal, based on the pitch and harmonics information. In order to evaluate the performance of the algorithm in real world scenarios, we checked the robustness of the algorithm in the presence of several types of noise, and especially noises such as car horns and car engines that are likely to be present in vehicles. In addition, we addressed real time and low complexity demands during the development of the algorithm. In particular, we used a voice activity detector, which disabled the operation of the algorithm when voice activity was not present. A database of baby cry signals was used for performance evaluation. The results showed good performance of the proposed algorithm, even at lo w SNR.

Author ασρƇ¥§: Department of Information Science Information Science and Engineering, HKBK College of Engineering Karnataka, India. e-mails: syeda.misbah016@gmail.com, padhu109610@gmail.com, mamthalgowda1804@gmail.com, shreemadhu620@gmail.com

2) Y. Lavner, R. Cohen, D. Ruinskiy, and H. Ijzerman, "Baby Cry Detection in Domestic Environment using Deep Learning," in 2016 IEEE International Conference on the Science of Electrical Engineering (ICSEE), Nov 2016, pp. 15. Automatic detection of a baby cry in audio signals is an essential step in applications such as remote baby monitoring. It is also important for researchers, who study the relation between baby cry patterns an d various health or developmental parameters. In this paper, we propose two machine learning algorithms for automatic detection of baby cry in audio recordings. The first algorithm is a low-complexity logistic regression classifier, used as a reference. To train this classifier, we extract features such as Melfrequency cepstrum coefficients, pitch and formants from the recordings. T h second algorithm uses a dedicated convolution alneural network (CNN), operating on log Melfilter bank representation of the recordings. Performance evaluation o the algorithms is carried out using an annotated database containing recordings of babies (6 months old) in domestic environments. In addition to baby cry, these recordings contain various types of domestic sounds, such as parents talking and door opening. The CNN classifier is shown to yield considerably better results compared to the logistic regression classifier, demonstrating the power of deep learning when applied to audio processing.

3) S. Asthana, N. Varma, and V. K. Mittal, "Preliminary Analysis of Causes of Infant Cry," in IEEE International Symposium on Signal Processing and Information Technology, ISSPI December 15-17, 2014, pp. 468–473. Infant crying comprises a rhythmic pattern of cry sounds and inhalation. Unlike in adults, crying is the only means of communication for an infant. Most signal processing tools that work w ell for adults are not adequate in the case of infant cry sounds. Hence there is a need to develop methods for extracting feature s from these sounds, for better understanding. This paper describes a database collected for the analysis of infant cries vis-a-vis their causes, using spectrograms. The fundamental frequency, limited to adults, can go muhigher in the case of infant cries, along with rapid changes in F. Signal processing methods like autocorrelation and linear prediction analysis are used for analyzing the infant cry sounds and extract features like fundamental frequency, energy etc. Spectrograms providing the ground truth and information about the fundamental frequency with harmonics are examined in this preliminary analysis. An attempt is made to classify the infant cries into six categories such as pai n, discomfort, ailments, emotional need for attention, hunger an d cry due to manipulation.

4) V. K. Mittal, "Discriminating the Infant Cry Sounds due to Pain vs. Discomfort towards Assisted Clinical Diagnosis," in 7t h Workshop on Speech and Language Processing for Assistive Technologies, SLPAT 2016, San Francisco, USA, 13 September 2016, 2016, pp. 3742. Cry is a means of communication for a n infant. Infant cry signal is usually perceived as a high- pitched sound. Intuitively, significant changes seem to occur in the production source characteristics of cry sounds. Since the in stantaneous fundamental frequency (F) of infant cry is much higher than for adults and changes rapidly, the signal processing methods that work well for adults may fail in analyzing these signals. Hence, in this paper, we derive the excitation source features F and strength of excitation (SoE) using a recently proposed modfied zero frequency filtering method. Changes in the production characteristics of acoustic signals of infant cries due to pain and discomfort are examined using the features F, SoE an d signal energy. These changes are validated by visually comparing their spectrograms with the spectrograms of the acoustic signals. Effectiveness of these discriminating features is examined for different pain/discomfort cry sounds pairs in an „Infant Cry Signals Database (IIITS ICSD)", especially collected for this study. Fluctuations in the features F, SoE and energy are observed to be larger in the case of infant cry due to pain, than for discomfort. These features can help in developing further the clinical assistive technologies for discriminating different infant cry types and initiating the remedial measures automatically.

5) S. Sharma and V. K. Mittal, "A Qualitative Assessment of Different Sound Types of an Infant Cry" (accepted for publication) in 4th IEEE Uttar Pradesh Section International Conference on Electrical, Computer and Electronics (UPCON 2017), India, Oct. 2017 Acoustic characteristics of the cry sound can indicate cry cause, as it can be perceived easily by humans. Features melodyont our, MFCCs and harmonics factors have been explored to identify different sound types of infants cries. But detection of cry- causes is lesser explored. In this paper, different types of infant cries are analyzed from the spectral patterns derived from acoustic signals. Different cry sound patterns are identified related to different cause-factors of infant cries. An Infant Cry Sounds Database (IIITS- ICSD 2), consisting of infant cry sounds signals for 7 different cry cause categories, is analyzed. It consists of cry sounds signals categorized for different age-groups of infants. Features F and

Formants (F1, F2, F3, F4, F5) are used. The F is extracted from the cry signal using autocorrelation of the signal, and also by auto-correlation of linear prediction (LP) residual, for validation purpose. The formants are derived using LP spectrum. The cry sounds of infants in the age group of months to 22 months, exhibit remarkably distinct patterns of growing distributed energy with growing age. These spectral patterns are consistent for both male and female infants. In few cry sounds, the pitch variation effects for the Shrill and Growl type sounds are also observed. Whereas in few cry sounds, the Wheezing effect is observed, t hat has a peculiar effect on the cry melody contour. The formant frequencies of different cry sounds also indicate differences in characteristic patterns. Qualitative assessment of typically different cry sound types is attempted by identifying regions of strained, growling or shrill sound effect onsets, in a cry acoustic signal. This study can help in gaining insight to pathological condition and age of an infant, by acoustic analysis of the cry signal. It can further help towards assisting medical diagnosis, earl y detection of ailments and timely cure as well.

III. Components

Arduino UNO
Temperature sensor-LM35
Speaker –APR9600
Moisture sensor
Noise sensor
Driver circuit
DC motor
Power supply
Web camera
Wifi module
Arduino UNO 1.8.5 IDE

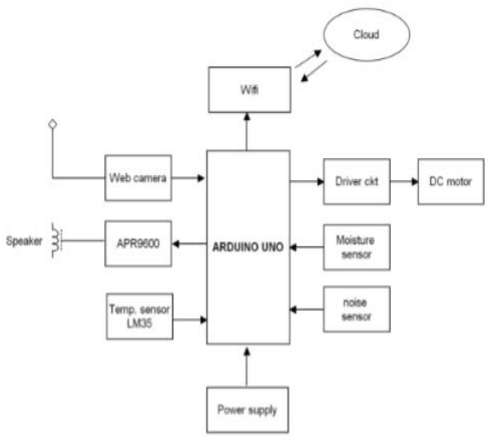

Figure 1: Shows a block diagram of smart baby cradle

IV. Methodology for Proposed System

We propose a Method using IOT where the sensor value are fed to the microcontroller by means serial communication using UART protocol which is Asynchronous means that data is trans ferred without support from an external clock signal. transmission method is perfect for minimizing the required wires and I/O pins, but it does mean we need to put some extra effort into reliably transferring and receiving data. These sensor values are t hen uploaded on the cloud which are accessed by the concerned person through android application i.e. BLYNK application which is designed for the Internet of Things. It can control hard ware remotely, it can display sensor data, it can store data, vizualize it and do many other cool things anywhere in the world. There are three major components in the platform:

1) Blynk App -
   allows to you create amazing interfaces for your projects using various widgets we provide.
2) Blynk Server -
   responsible for all the communications between the smartphone and hardware. You can use our Blynk Cloud or run your privat e Blynk server locally
3) Blynk Libraries - for all the popular hardware platforms – enable communication with the server and process all the incoming and outcoming commands The controlling is also done thro ugh the applications which in turn initiates the respective relays using BLYNK applications Cradle starts swinging automatically when baby cries and swings till baby stops crying. A sound detector is interfaced to the controller which senses sound when baby cries and activates the controller with its digital output. Sounds an alarm when mattress gets wet. A temperature sensor kept under the bottom cover where the baby sleeps can sense the temperature all time and sends analog signals to the inbuilt AD C of the RL78 controller. The digital data can be continuously monitored. A reduction in temperature indicates the wetness in t he cover. The controller can be made to activate an alarm, so that his/her cover be changed. Sounds an alarm if baby cries for more than a stipulated time indicating that baby needs attention by sending a notification through GSM interface to android based handsets. Also plays music and talk to the baby with the help of a mic. A camera fixed also helps to keep an eye on the baby. The android interface holds an interface which has a food chart to help parents which is predefined with the help of nutritionists to maintain good health of the baby.

V. Expected Outcome

In the present study, an smart baby cradle system is being developed which is capable of detecting the movement of the baby and initiate cradle swing. Additionally, in the event of bed wet or hyperthermia, the developed system is capable of sending notifications to android interface. The device can be used to minimize the workload of the parents and nurses in home and hospitals respectively.

VI. Advantages

1. Easy for parents to monitor their baby
2. Provides security
3. Small in size
4. Lightweight
5. Easily portable from one place to another
6. Easy to use
7. Cost efficient
8. Less power consumption

VII. Future Scope

To enhance the security of the baby apart from the basic requirement more modules can be added like PIR sensor to detect the motion, camera to see the surroundings or the person who has been around the baby. To extend the range of the signals we can implement the same circuit with help of GSM module and Wifi module. Using GSM module, the message can be send to parent even in different city, country so parents can monitor their baby even on business trips for companies. One of the most important feature that can be added to this device is that a trigger can be added in such a way that if the parents are very far away in different city or they could not reach to their baby than through the app they should be able to trigger an emergency help with nearest police station. For this GPS services can also be included. This ensures expert level safety for the child. More sensors to record statistics of body like body temperature, heartbeats, sleeping pattern can be observed and using data science technology more information about the baby can be known. The data received from the sensors can be stored in the database and using data analytics a pattern can be recorded when the baby cries or at what time of the day the baby wets the bed t he most. This would increase the credibility of the gear using t he machine learning techniques, prediction & modeling. The mobile app we used for the prototype model is the builti app for Bluetooth module. Depending upon the requirement, android or ios app can be made which increases the scope of project in app development framework. Additional functionalities like triggering emergency from app tracking the baby from app using GPS can also be added.

VIII. Conclusion

The above proposed IOT based algorithm is designed to connect the parents to the baby through a device in order to keep the parents informed about the security of baby when they are not close to their baby. The sensors used ensure that the major aspects of security are covered. Parents can keep a check on their baby very easily through a mobile device. The algorithm fits best for the working parents or those who travel a lot especially for business purpose. There is also large amount of opportunity that opens up in order to modify the system further to extend t he level of security using other different sensors, using cloud computing technique and machine learning to extend the further research. The Iot has transformed our everyday lives at a significant exponential rate. The idea of connecting the information recorded from surroundings using complex sensors and sending it to mobile device shows the vast possibilities of how IoT can influence the lives of people through smart devices what they are called these days. We have already seen the reach of IOT in medical, security, environmental and many other fields. For example –The Running hand or wrist gear that measures all the vital statistics of the body and sends it to your device in real time and you can easily monitor your performance.

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Impact Analysis of Advising and Counseling System for Under-Graduation Students in Bangladesh

By Md. Biplob Hosen, Mst. Arifakhatun & Khadija Islam

Daffodil International University

Abstract- In the development process of a student, counseling and advising system plays a crucial role. By providing proper counseling through empathetic relationship, we can learn about the problems of a student. With the help of this learning, we can find out all of the negative issues that are happening with the students. Such as- why their results are poor, why they are irregular in their study and many more. Even providing counseling, we can know their weakness, strength, and opportunities. Not only that, but it also helps to build a good relationship between teachers and students. Students can overcome their gap that exists between students and teachers, and that will ensure good bonding among them. So counseling is a must factor to develop a qualified student. Before taking any decision against any student, it's important to learn their present condition through counseling. That's why proper counseling with an effective way is necessary for all students. To understand the effects of counseling and academic advising, we surveyed on Daffodil International University. With this survey, we tried to realize all of the facts related to it. Based on the analysis, we have also mentioned some recommendations which may be helpful for the betterment of the undergraduate students.

Keywords: *advising, counseling, questionnaire, group discussion, recommendation.*

GJCST-G Classification: *I.2.m*

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Impact Analysis of Advising and Counseling System for Under-Graduation Students in Bangladesh

Md. Biplob Hosen [α], Mst. Arifakhatun [σ] & Khadija Islam [ρ]

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I. Introduction

When a student comes to a university, they have to face a number of problems. Counseling and advising are one of the key processes to understand the student's problems and providing the necessary support. There are several types of problem which are to be faced by a student both in their academic and personal life. For the betterment of their educational life and career, this process is being applied in most of the universities of the world. In this research, we tried to do a rapid assessment to find out the effectiveness and drawbacks of the currently running system. We have analyzed both students and teachers opinions regarding counseling. For this purpose, we have used two dimensional research methodologies. We have conducted a survey-based research and a group discussion based research to find and cover different aspects of the counseling and advising system. We present evidence to suggest that, ensuring proper guidelines through advising and counseling influences the success of the students. The rest of the paper includes: literature review in section II, research methodology in section III, result analysis in section IV, some recommendations in section V and, conclusion and future work in section VI.

II. Literature Review

Authors in [1] have mentioned the importance of advising for students' satisfaction. According to them, students are less satisfied with support services which include: academic advising and career services. In [2], authors have discussed on mental health issues and counseling services. They have estimated the prevalence of anxiety and depression, suicide and suicidal ideation, and violence among students. According to their opinion, supporting the emotional and developmental growth and mental stability of the students bring success in their academic, personal and professional lives. Students mental health concerns are focused on [3], and authors have discussed responses of the campus counseling services to the concerns. The role of faculty advisors' is very important in the developments of graduate students according to the authors in [4]. For women in science, technology, engineering and mathematics, the effect of counseling is especially crucial. According to the authors in [5], stressors exist in academic campus, and advisors are responsible to help students to deal with stressors. In [6], authors have mentioned the effectiveness of technology-based advising tools. An intrusive advising principle to achieve academic success and set of predefined goals are suggested in [7]. Authors in [8] have discussed a regression discontinuity design for counseling students for the enrolment in the academic program. In [9], authors have examined the impact of counseling for underprepared students. They have used variance and logistic regression analysis for analyzing the performance of the students. In [10], authors have evaluated academic advising in terms of student needs, expectations and success. Authors in [11] have emphasized on more counseling for international

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students to solve their problems. According to the authors in [12], advisors play a significant role in the success of international students with the help of the model named intercultural communication competence. In [13], authors have mentioned the importance of advising and counseling to solve problems, and success in academic, and professional career. They have surveyed from 2005 to 2013. Analysis of the survey shows that, female students and newly admitted students are mostly benefited with academic advising.

III. Methodology

In this research, we have tried to meet with the two end parties of the counseling and advising system to figure out what they think about counseling and advising system. The first party is the support provider of the system, and in this system, they are the faculty members of Daffodil International University. The second party is the support or service receiver of the system, and in this system they are the students of the university. We provided different survey questionnaire to these two types of people. Through this questionnaire, we have tried to know what they think about the effectiveness of the counseling and advising system. We also conducted a Focus Group Discussion to find out some aspects which affect both faculties and students regarding counseling and advising.

a) Statistical Output Analysis

From the survey, we have found various output results regarding many aspects. In this survey, we have responses from 143 faculty members and 63 students. We have analyzed their responses regarding these questions and found the frequent responses and thoughts. [Fig. 3.1] presents the working process of our research work.

IV. Analysis

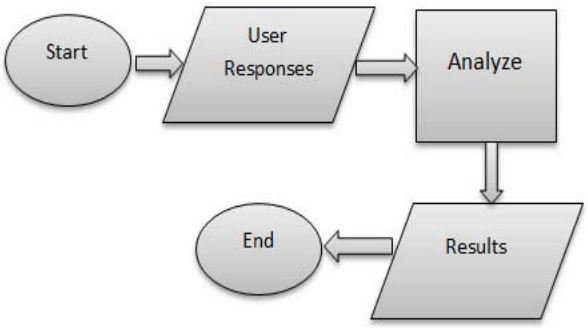

Figure 3.1: Workflow Diagram

a) Teacher's Response

In the first question, teachers were requested to share their opinions regarding the usefulness of the counseling/advising system. In response, most of the faculty members responded positively. The output shows that, counseling and advising system is an important and essential tool in the university system. We have categorized the responses in 6 major categories which are presented in [Fig. 4.1].

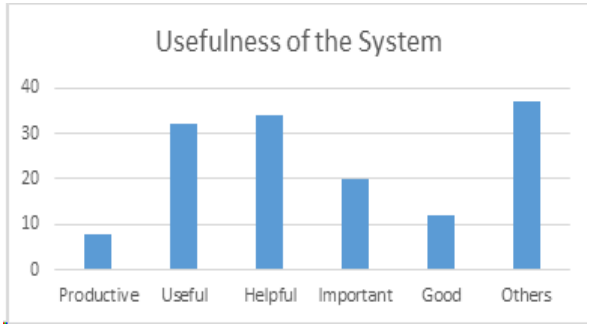

Figure 4.1: Teachers responses on the effectiveness

In the second question, teachers responses were regarding whether they are familiar with DIU introduced counseling and advising system or not. Most of the teachers answered that they know about this. The percentage is shown in [Fig. 4.2].

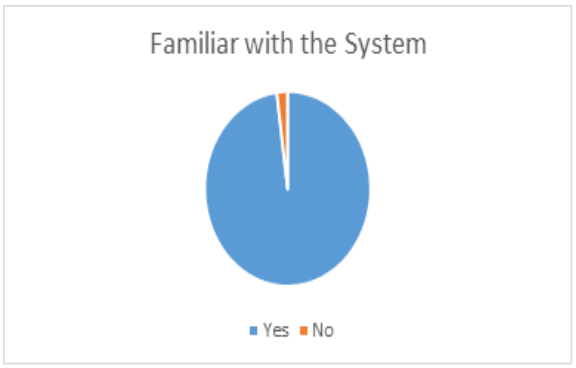

Figure 4.2: Whether teachers are familiar with the system

In the third question, we wanted to know from the teachers, how often they engage themselves in advising and counseling in a week. The output of the responses is given in [Fig. 4.3].

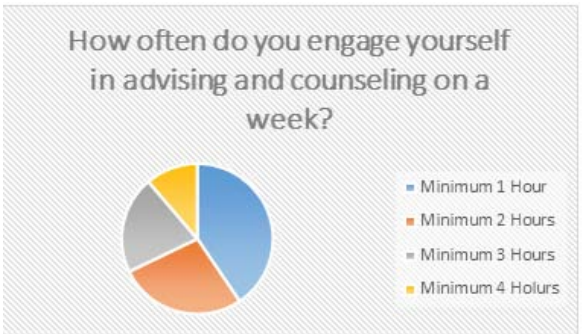

Figure 4.3: Engagement of teachers in counselling

In the fourth question, we tried to know the strategy of the teachers by which they help students to

develop themselves through counseling and advising system. Some key strategies are listed below:

- Creating a workable map.
- Student's quality level classification.
- Friendly behavior.
- Providing proper guideline.
- Solving some non-academic problems.
- Enriching student's confidence.
- Sometimes group counseling.
- Counseling students maintaining a checklist.
- Making them conscious about attending classes.
- Extra time for weak students.

In the fifth question, we wanted to know about teachers' favorite activism to develop students.

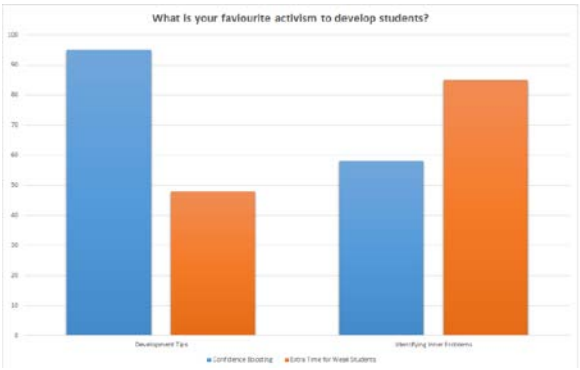

Figure 4.4: Teacher's favorite activism for developing student

In the sixth question, we have tried to figure out the obstacles faced by the teachers when they use the counseling system. 45.5% of the teachers face obstacles when they use the counseling system. The most frequent problem that they face is the technical problem like software problem. The second most frequent problem is that, most of the students are careless about counseling. Few teachers face lack of training experience regarding this matter, some of them face desk environment problem. Few teachers mentioned time problem because of participating class and other activities in the university.

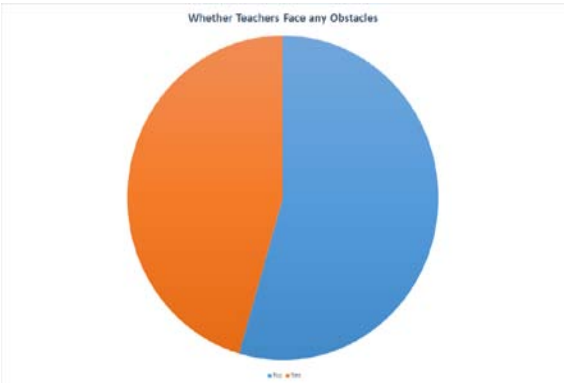

Figure 4.5: Whether teachers face any obstacles

In the seventh question, teachers answered which area they cover mostly in counseling sessions. In this question, we had three default options; among them, the most frequent area is that, they advise students to be a good human. They are also giving them course related supports and emphasizing them to get a good academic score. Teachers also counsel students by giving them career suggestion and try to solve their personal problem.

In the eighth question, teachers answered their least favourite aspects of counseling. In this question, we had 3 default options. Among them, most of the teachers don't like repeating the same topic they already have been shared previously. The second most frequent answer came from the teachers is their uncomfortable feeling of receiving phone calls in off pick hours, and in some cases they do not like to discuss about the exam and quiz issues regarding suggestions. The other least favourite aspects occur when they have to talk about the financial issue of student and when the student came just before the exam and don't come in time.

In the ninth question, teachers expressed their opinions about the motivation for counseling or advising. In this question, there were three default answers. Where, teachers could select more than one answer. The most frequent answer is that, teachers want to solve student's individual problem (95.8%). Teachers also try to provide support to the students so that the students can keep a good result in their course (30.3%). They also do counseling and advising because of their availability of time (21.8%).

In the tenth question, teachers answered why their students attend counseling and advising with them. In this question, we had four default answers where the teachers could select more than one. The most common reason behind attending counseling and advising is the development of an attitude of the student (66.9%). Teachers think that, students come to get counseling when they face any problem or trying to learn something (47.2%). They also think, some students come for having a lack of concentration in classes (25.4%).

In the eleventh question, teachers expressed their opinions about the current situation of counseling and advising. In this question, there were two default answers, and teachers could select more than one answer also give a new answer. Among them, most of the teachers think that there is a necessity of continuous follow up with keeping records online. Some of them think that there is a necessity of change or update in the system.

b) Student's Response

The first question that the students responded was about their opinion on whether they think that teachers counseling and advising is effective or not for

them. Most of the students think that, it is an effective system. The percentage rate is presented in [Fig.4.6].

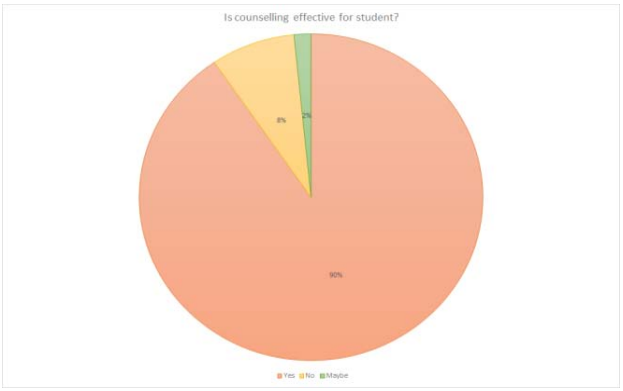

Figure 4.6: Student's opinion about the effectiveness of counseling

In the second question, students expressed their suggestions for making the counseling system more effective. Highest numbers of students have no suggestion regarding this issue (16). Some of the students think that, they need more active, helpful and careful teachers for the betterment of this system (10). Few students think that it is okay (9), need online counseling (4), and should be encouraging to the students (5).

In the third question, we wanted to know whether students are familiar with the DIU computer base counseling system or not. 60% of them are not familiar with the counseling and advising system. The most frequent reason behind saying "No" is that they know nothing about the system.

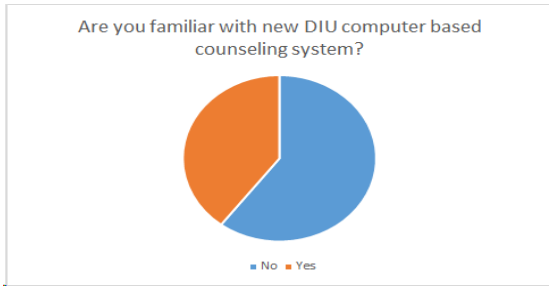

Figure 4.7: Student's familiarity with counseling

In the fourth question, the students answered whether they are encouraged by their teachers to attend counseling/advising or not. Most of the student said that they are encouraged by their teachers. The percentage rate is presented in [Fig. 4.8].

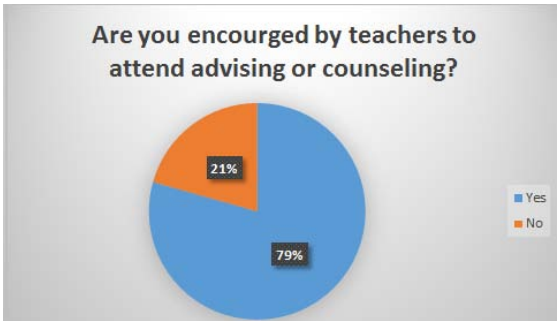

Figure 4.8: Students are encouraged by teachers

In the fifth question, we tried to figure out the ways teacher encouraged the students. There is common answer in this question. Most of the students say that they are encouraged by telling the effectiveness of the counselling (51). Few students go for counseling when they face any problem (4) and when the teachers tell about the counseling hour (4). Some of the students replied that, their the teacher doesn't encourage them.

In the sixth question in the research, we tried to find out the desirable areas of the students which should be covered in the counseling session. Most of the students want career-related counseling than only academicals issues. They also think that they need counseling on their personal problems which affects their study.

In the seventh question, we tried to know about the student's opinion on a comfortable method to get counseling. Most of the students prefer in-person counseling where some others want online counseling.

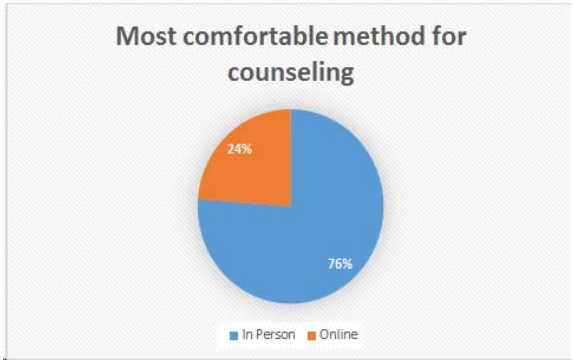

Figure 4.9: Comfortable method of getting counseling

In the eighth question, students had to answer whether they need more counseling hours before examination or not. Most of the student thinks that they need extra counseling hours before midterm- and final exam (84%).

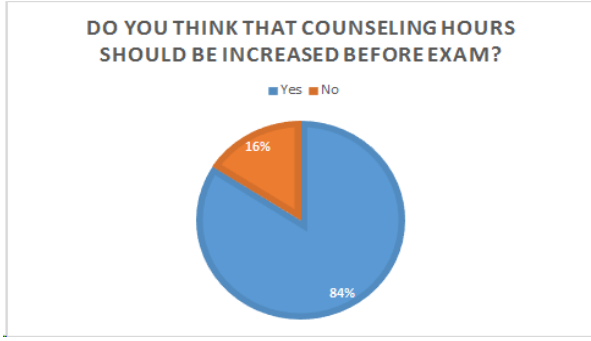

Figure 4.10: More counseling hour before the exam

In the ninth question, we wanted to know the students' opinions whether they want to get mandatory counseling for the low-grade (CGPA) students or not. In this question, we found most of the students want mandatory counseling for the low-grade students (CGPA) (82.5%).

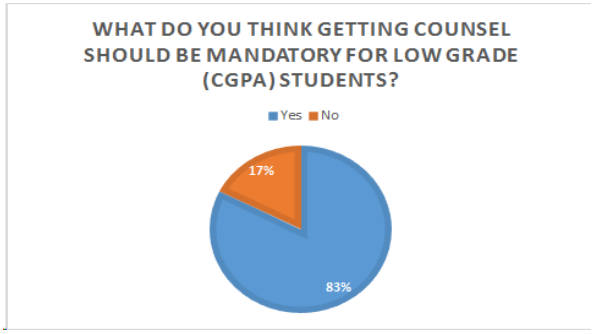

Figure 4.11: Mandatory counseling for low-grade student

In the last question, we asked for new ideas from the students to maintain a more effective counseling system. Where, we found some ideas about counseling. Some students think that, they need more helpful and active teachers, more time, friendly behavior from the teachers and want motivation about career plans. Some students shared some other ideas too.

V. Recommendation

Some recommendations are listed to improve the effectiveness of the advising system which came out from the research.

a) Maintaining Attendance Book

It will contain more student information than the previous. The recommendations are as follows:

- Add some extra options like images of every student.
- Classify activities of the students.

b) Students Classification

Teachers are recommended to classify students on the basis of their activity. Students of a different class should get different advising and counseling on the basis of their needs and demands. For example, when a group of students needs advice and counseling about a study in abroad, they may get their required information from the teacher or advisor as a group. It will minimize pressure on faculty members with a big number.

c) Training Session

Conduction of training on counseling and advising for the faculty members is necessary. Some of the teachers don't have a clear concept on the counseling system, and about various facilities of the university. In the training session, these things should be covered.

d) Proper Space for Counseling

It is also necessary to furnish faculty rooms for counseling. Moreover, some special rooms for counseling can be designed in different floors. Faculty members can use these room in different schedule maintained from the department.

IV. Conclusion and Future Work

In this research, we have analyzed the significance of counseling and advising system for the development of undergraduate students. For this analysis, we have conducted a survey where we had two groups of academic people as faculty members and students. We have also conducted a focused group discussion. We have analyzed several important factors related to counseling and advising. Based on the analysis, we have proposed some recommendations. In future, our goal is to implement data mining techniques to find out more information from the analysis which will assist the teachers.

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ESL University Students' Attitudes towards using Whatsapp in Academic Writing

By Joel M. Magogwe & Olumide Jaiyeoba

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Keywords: whatsapp efficacy, perceived usefulness, perceived ease of use, attitude and behavioural intentions and Botswana.

GJCST-G Classification: F.2.2

Strictly as per the compliance and regulations of:

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Keywords: whatsapp efficacy, perceived usefulness, perceived ease of use, attitude and behavioural intentions and Botswana.

I. Introduction

Worldwide usage of the Internet is playing a crucial role in social networking, planning and decision making. For instance, the WhatsApp application in the Internet has been on the market since 2010 and has been used to send text messages, attach images, audio and visual files and web addresses. According to Bouhnik and Deshen (2014: 1), "Over the last two years, the application has become very popular, gaining over 350 million Materials published as part of this publication, either on-line or in print . . . ". WhatsApp enables communication with anyone who possesses a Smartphone, has an active internet connection, and has installed the application. Educationists have found it necessary to employ WhatsApp in learning and teaching. Research shows that students can follow their activities off campus using WhatsApp, SMS, Facebook, Twitter, LinkedIn and Blogs (Dashti & Aldashti, 2015; Evans, 2014). The WhatsApp application in particular can be ideal for students because its cost is low and that enables students and teachers to communicate, chat, share ideas and send audio and video messages as frequently as they wish and at any time of the day.

Despite communication and networking opportunities provided by the WhatsApp tool, sometimes students do not find cell phones effective in learning although they enjoy using them (Anastasia, 2013). Some of the students do not have a Smartphone for reasons known to them. We therefore found it necessary to understand and track Botswana university students' online use, perceptions and behaviours in terms of the efficacy of WhatsApp technology in improving academic writing. This study is justified because, according to Dashti & Aldashti (2015:15), there is a "growing complaint about the negligence of utilising social media technology by language teachers". They further point out that college students' needs regarding the use of mobile teaching aids have hardly been sought from the students' point of view.

Furthermore, there is acute paucity of studies investigating nomological web between perceived ease of use, perceived usefulness, perceived web based privacy, extent of WhatsApp use, attitude and behavioural intentions among University students in Botswana. To understand the relationship between these constructs and academic writing skills, The Technological Acceptance Model (TAM) was used. According Venkatesh and Davis (1996), the TAM is widely used by researchers and practitioners to understand and explain users' acceptance of information technologies based on the function of behavioural intention metrics. Lee et al (2012) thus posit that the TAM is the most influential model of explicating adoption behavior of information technology and information system. Based on the aforementioned, this study resonates with knowledge based drive of Botswana's economy as it seeks to diversify from mineral led economy and empower Batswana youth that constitute over 60% of the Botswana Population. Furthermore, this study sought to contribute to extant literature by providing insights regarding the adoption or efficacy of WhatsApp technology in improving academic writing skills of University students in Botswana. Iyanda and Ojo (2008) further noted that the Botswana government has recognized the critical role of information technology as an enabler in the quest to realize its socio-economic objectives and translate its

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vision into reality. Iyanda and Ojo (2008) further contended that the growth of ICT usage occurred in spite of technical difficulties such as lack of skilled workers and inadequate physical structure. This study thus sought to unravel the extent of efficacy of WhatsApp technology in improving academic writing skills among Batswana students. This study is expected to provide an impetus as to the extent to which students are empowered for educational advancement. Consequently, the objectives of this study are as follows:

1. To analyze the extent of WhatsApp use in improving academic writing skills on behavioural intentions of University students in Botswana.
2. Assess the impact of Perceived Ease of Use, Perceived Usefulness, Perceived web privacy and Attitude on behavioural intentions among Batswana Youth.

II. Literature Review and Hypotheses Development

a) Academic Writing

The role of WhatsApp in advancing academic writing at university level is examined in this study. This study defines academic writing as writing found in essays (the focus of this study), research papers, and conference papers. According to Merryweather, Norton, and Foxcroft, 2014), academic writing is "conceptualised as more than simple use of literacy skills such as grammar, punctuation and spelling". According to Itua et al. (2014), in academic writing students are expected to write clear transitions between ideas and arguments, with careful referencing of works from which the ideas were borrowed. Furthermore, there should be logical organization of ideas and recognition of counter-arguments. However, scholars indicate that many second language students find it challenging to write their thoughts and ideas (Gholaminejad et al. 2013; Abu-Rass, 2001). According to Gholaminejad et al. (2013), both native and non-native speakers of English find it challenging to harmonise the content, organization, purpose, audience, vocabulary, punctuation, spelling and mechanics as they write their thoughts and ideas.

b) Perceived Usefulness and Ease of Use

With a view to the writing challenges enunciated above, and to the contribution of technology in language learning, this study first sought to establish the relationship between behavioural intentions of the Botswana university students and perceived usefulness and ease of use of the WhatsApp application in academic writing. These dimensions are measured as fundamental parts of the Technological Acceptance Model (TAM). This model was introduced by Davis (1989) to determine individuals' intentions to utilize a variety of technologies such as electronic mail (e-mail), word processing and graphics software. According to Kucukusta, Law, Besbes, and Legohérel, (2015:186), "The TAM model is widely used by researchers and practitioners to understand and explain user acceptance of information technologies based on the function of perceived usefulness and perceived ease of use". Davis (1989:320) defines perceived usefulness as "The degree to which a person believes that use of a particular system would enhance his or her job performance. On the other hand, perceived ease of use is defined by Davies (1989:320) as "The degree to which a person believes that using a particular system would free of effort".

This study therefore hypothesized first that the WhatsApp application could be positively and significantly related to the students' intention to use it to improve their academic writing skills; hence:

H1: Perceived usefulness is significantly and positively related to behavioural intention of University students in Botswana's intention to use WhatsApp in academic writing.

The second hypothesis of this study is that:

H2: Perceived Ease of use is significantly and positively related to behavioural intention of University students in Botswana.

As already indicated, most students enjoy using WhatsApp. For instance, in a September 2013 study by Robinson, Behi, Corcoran, Cowley, Cullinane, Martin, & Tomkinson, (2015), a group of 11 first-year undergraduate diagnostic radiotherapy students perceived WhatsApp as a useful method of keeping in touch and decided to form a new WhatsApp group. A more thorough study was later on done to confirm these findings.

c) Perceived risk

Many studies have tested the influence of perceived risk on various innovation adoptions such as internet shopping (Forsythe & Shi, 2003). E-services (Featherman& Pavlov, 2003) and electronic business (Kim et al, 2008). We thus hypothesize that:

d) Attitudes

The perceived usefulness and perceived ease of use dimensions of the TAM model have also been found to jointly influence the attitude towards the intended action which in this case is the use of WhatsApp in academic writing. This study thus hypothesized that:

H3: Attitude is significantly and positively related to behavioural intention of University students in Botswana.

It was important to study attitudes towards writing in order to establish their role in the writing proficiency of the university students in Botswana. Weeks (2016) lamented that Botswana graduates are

weak in language, social skills numeracy and attitudes. According to Gholaminejad et al. (2013), one of the outstanding factors influencing the students' writing achievement is attitudes to writing. According to Jabeen & Kazim Shah (2011), attitudes determine the way we view the world and respond to different entities in the world (cited in Gholaminejad et al. (2013). The term 'attitude' was first defined by Gardner and Lambert as early as 1932 as "an inference which is made on the basis of a complex set of beliefs about the attitude object" (cited in Gardner, 1980:267). Gardner further defines 'attitude' as "individual feelings, prejudice, pre-conceived ideas, fears, and convictions about a specified topic" (Gholaminejad et al. 2013:1139).

III. Methodology

This study is descriptive and quantitative in nature. A total of 120 questionnaires were distributed with a response rate of 85%. 70 questionnaires were administered at the University of Botswana and 50 at Botho University also in Botswana. The questionnaire consisted of a 5-Point Likert Scale. Using SPSS, the scale items were subjected to validity and reliability in order to explicate the psychometric competence of the scale items in the Botswana context. Data analysis was conducted using correlation and regression analysis in order to establish the association and relationship of the hypothesized sub-constructs in this study. Simple random probability sampling technique was adopted in this empirical study. Scale items were adapted from Davis (1989) TAM model.

IV. Results and Discussion

a) Demographic Information

Section A of the questionnaire measured demographic information of the students. Table 1 below shows that of the sampled respondents, 83% of the respondents fall in the category of 20 to 25 age bracket. 17% of the respondents fall in the 26 to 30 years bracket. With respect to gender, 50% of the respondents are male, while 50% of the sampled respondents are female. Furthermore, with respect to years of using WhatsApp, over 66% of the respondents as shown in Table 3 have used WhatsApp for less than 5 years while 33% stated that they have used it for over 5 years.

Table 1: Demographic Information

Item	Category	Frequency	Valid Percent
Age	20-25	85	83.3
	26-30	17	16.7
Gender	Male	51	50
	Female	51	50
Number of years using WhatsApp	Less than 5 years	68	66.7
	5-10 years	34	33.3

b) Extent of Use of WhatsApp Learning in General

As indicated in Table 2, 33% of the respondents stated that they considered WhatsApp an important tool for learning while over 50% stated that they did not consider WhatsApp as an important tool for learning as regards the extent of WhatsApp Use in Botswana.

Table 2: Extent of whatsapp use

Scale	Frequency	Valid Percent
Strongly Agree	17	16.7
Agree	17	16.7
Neutral	17	16.7
Disagree	34	33.3
Strongly Disagree	17	16.7

c) Attitudes towards using WhatsApp

With respect to the psychometric nomenclature of the attitude to WhatsApp use among University students, the Cronbach Alpha is 0.698. Mean values of the scale items range from 3.17-4.00. The factor structure (Validity) using varimax rotation range form 0.567-0.786. Average variance Extraction (AVE) is 78.159 indicating the robustness of the factor structure. Kaiser Meyer Olkin Measure (KMO) of sampling adequacy is 0.541. The robustness of the factor structure in terms of validity is also elucidated here.

d) Perceived Usefulness

For Perceived usefulness, the Cronbach alpha is 0.965, mean values range from 3.33 to 3.67, factor structure (Validity) range from 0.673-0.721 and KMO is 0.652 and AVE is 54.67. The robustness of the factor structure is also explicated here in terms of validity and reliability.

e) Perceived Usefulness

For Perceived Ease of Use, Cronbach Alpha, mean values, Factor structure (Validity), KMO and AVE

are 0.678, 2.87-3.78, 0.725-0.823, 0.736 and 63.17 respectively. The robustness of the factor structure is also explicated here in terms of validity and reliability.

f) Perceived Privacy

For perceived web based privacy, Cronbach Alpha, mean values, factor structure (validity), KMO and AVE are 0.765, 3.23-3.64, 0.711-0.834, 0.821 and 67.23 respectively. For Attitude, mean values range from 3.16-4.00, Cronbach alpha is 0.944, factor structure range form 0.674-0.723, KMO and AVE are 0.652 and 56.23 respectively. The robustness of the factor structure is also explicated here in terms of validity and reliability.

g) Behavioural Intention

For Behavioural intention, Mean values range from 0.278-0.345, Cronbach Alpha is 0.764, factor structure range form 0.73-0.945 and KMO and AVE are 0.78 and 67.2 respectively. The robustness of the factor structure is also explicated here in terms of validity and reliability.

Table 5 shows the extent of Whatsapp use, perceived usefulness, perceived ease of use, perceived wen-based privacy and attitude are significantly associated with behavioural intention in this empirical study.

Table 3: Correlation matrix of association between perceived ease of use, perceived usefulness, perceived web based privacy, attitude and behavioural intentions

Correlations							
		Behavioural Intention	Extent of WhatsApp use	Perceived usefulness	Perceived ease of use	Perceived web-based privacy	Attitudes
Behavioural Intention	Pearson Correlation	1	.291**	.535**	.078	.312**	.629**
	Sig. (2-tailed)		.003	.000	.436	.001	.000
	N	102	102	102	102	102	102
Extent of WhatsApp use	Pearson Correlation	.291**	1	.896**	.570**	-.630**	.812**
	Sig. (2-tailed)	.003		.000	.000	.000	.000
	N	102	102	102	102	102	102
Perceived usefulness	Pearson Correlation	.535**	.896**	1	.637**	-.300**	.841**
	Sig. (2-tailed)	.000	.000		.000	.002	.000
	N	102	102	102	102	102	102
Perceived ease of use	Pearson Correlation	.078	.570**	.637**	1	.015	.526**
	Sig. (2-tailed)	.436	.000	.000		.878	.000
	N	102	102	102	102	102	102
Perceived web based privacy	Pearson Correlation	.312**	-.630**	-.300**	.015	1	-.338**
	Sig. (2-tailed)	.001	.000	.002	.878		.001
	N	102	102	102	102	102	102
Attitudes	Pearson Correlation	.629**	.812**	.841**	.526**	-.338**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.001	
	N	102	102	102	102	102	102

***. Correlation is significant at the 0.01 level (2-tailed).*

The results in Table 5 show that there is a positive and significant relationship ($r=0.291$, $p<0.01$) between extent of use and behavioural intentions of WhatsApp in academic writing by University students in Botswana; positive relationship (0.535, $p<0.01$) between perceived usefulness and behavioural intentions. Perceived web based privacy and behavioural intention ($r=0.312$, $p<0.01$); and attitudes and behavioural intention ($r= 0.629$,$p<0.01$). The perceived Ease of Use and behavioural intention are not significantly and positively associated ($r=0.078$, $p<0.01$). These findings indicate that perceive usefulness, attitude, perceived web based privacy are significantly associated with behaviourla intentions, while perceived ease of use is not significantly associated with behavioural intention as regards WhatsApp use in Botswana. Weeks (2016) thus lamented that Botswana graduates are weak in language, social skills numeracy and attitudes. Based on the aforementioned, Gholaminejad et al. (2013) concluded that one of the outstanding factors influencing the students' writing achievement is attitudes to writing.

Table 6, Perceived usefulness, perceived ease of use, perceived web based privacy, attitude account for 96.7% variation in the behavioural intention. The Durbin Watson value of 2.194 also corroborates this assertion.

Table 4: Regression analysis

Model Summary[b]										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.984[a]	.968	.967	.32932	.968	733.376	4	97	.000	2.194
a. Predictors: (Constant), ATT, PWPTT, PEUTT, PUSTT										
b. Dependent Variable: BITT										

As shown in Table 7, Perceived usefulness (β= 0.518, t= 13.813), (β= 0.690, t=28.092), (β= 0.752, t=37.368), and (β=0.810, t= 23.761). Hypotheses Hi, H2, H3 and H4 are supported in this empirical study.

Table 5: Regression showing the relationship between perceived ease of use, perceived web based privacy, perceived usefulness, attitude and behavioural intention as regards whatsapp use for learning in botswana

Coefficients[a]													
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	Variance Inflation Factor
1	(Constant)	4.376	.220		19.910	.000	3.94	4.81					
	Perceived Usefulness	.206	.015	.518	13.813	.000	.177	.236	.535	.814	.251	.235	4.262
	Perceived Ease of Use	.520	.019	.690	28.092	.000	.557	.483	.078	-.944	-.510	.548	1.826
	Perceived Web Based Privacy	.296	.008	.752	37.368	.000	.280	.312	.312	.967	.679	.815	1.226
	Attitude	.321	.014	.810	23.761	.000	.295	.348	.629	.924	.432	.284	3.523
a. Dependent Variable: Behavioural intention													

As indicated in table 7, perceived ease of use, perceived usefulness, perceived web based privacy, and attitude are significantly and positively related to behavioural intention. Kucukusta, Law, Besbes, and Legohérel, (2015:186), concluded that TAM model is widely used by researchers and practitioners to understand and explain user acceptance of information technologies based on the function of perceived usefulness and perceived ease of use". Davis (1989:320) further noted that perceived usefulness is the degree to which a person believes that use of a particular system would enhance his or her job performance. Hypotheses H1, H2, H3 and H4 are therefore supported in this empirical study in Botswana.

V. Limitations

It is not advisable to generalize the findings of this study given the small size of the sample. However, the findings provide an insight in the use of WhatsApp in education. Furthermore, perceptions may differ according to situations and contexts. Therefore, the findings of this study are applicable only to the context of the questionnaire which specifically talked about academic writing of essays.

VI. Implications and Conclusions

The theoretical contribution of this study is its support of previous findings (Kucukusta, Law, Besbes, and Legohérel, 2015) that the TAM as a useful model for measuring the influence of perceived ease of use, perceived usefulness, perceived web based privacy and attitude on behavioural intention. The study thus indicates that the WhatsApp platform could be utilized in addition to other social platforms to engage learners in the Educational industry in line with the aspiration for knowledge based economy in Botswana. Based on the aforementioned, the teaching of academic writing skills should be supported by the use of technology.

The WhatsApp tool can be a very convenient platform for answering questions and discussing academic writing skills by the students and their writing lecturers anywhere and at any time of the day. As indicated earlier, it can be used to discuss topics such as how to write a thesis statement of an argumentative essay. WhatsApp is cheap and can be conveniently found in Smartphones. The implication is that lecturers should create awareness of the importance of WhatsApp and its benefits in teaching writing skills and other topics.

This study highlights the usefulness of WhatsApp in education, in teaching writing skills and in

establishing rapport with the students. However, further research is recommended in examining perceptions between behavioral intention and use of other online platforms.

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Development of Electronic Commerce Adoption Model based on Structural Equation Modeling Techniques

By N. Kuruwitaarachchi, Mohd Shukri Ab Yajid, Ali Khatibi & S. M. Ferdous Azam

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Abstract- Advance Communication Technologies are playing a vital role in business today. In the world currently, many developing nations identified Small and Medium Scale organizations significantly important in counties' economic development. But the contribution from the SME sector is considerably low. Therefore, addressing this issue is important in business development. Among many reasons identified as barriers for SMEs to perform, studies have identified that low usage or not using technologies like E-commerce effected to this low performance. Therefore, studies are conducted to identify barriers to use technology in SMEs and many frameworks are tested and verified in different domains. In this study mainly tested and varied a framework which is considering Information Technological factors effecting the adoption of E-commerce technology and how it is effected for SME development. In this study framework is developed using literature analysis and hypothesis are developed based on past studies in terms of Information Technology factors as a main consideration. Model testing part is done using Structural Equation Molding using IBM AMOS.

Keywords: information technology; E-commerce; security, ease of use; E-commerce adoption; organization performance.

GJCST-G Classification: K.4.4

Strictly as per the compliance and regulations of:

Development of Electronic Commerce Adoption Model based on Structural Equation Modeling Techniques

N. Kuruwitaarachchi [α], Mohd Shukri Ab Yajid [σ], Ali Khatibi [ρ] & S. M. Ferdous Azam [ω]

Abstract- Advance Communication Technologies are playing a vital role in business today. In the world currently, many developing nations identified Small and Medium Scale organizations significantly important in counties' economic development. But the contribution from the SME sector is considerably low. Therefore, addressing this issue is important in business development. Among many reasons identified as barriers for SMEs to perform, studies have identified that low usage or not using technologies like E-commerce effected to this low performance. Therefore, studies are conducted to identify barriers to use technology in SMEs and many frameworks are tested and verified in different domains. In this study mainly tested and varied a framework which is considering Information Technological factors effecting the adoption of E-commerce technology and how it is effected for SME development. In this study framework is developed using literature analysis and hypothesis are developed based on past studies in terms of Information Technology factors as a main consideration. Model testing part is done using Structural Equation Molding using IBM AMOS. At the end of the study proposed framework is modified with statistical results and finally presented a framework which can be considered as a framework to understand the Information Technology factors effecting the E-commerce adoption and SME development.

Keywords: information technology; E-commerce; security, ease of use; E-commerce adoption; organization performance.

I. Introduction

For any developing nation Small and Medium Enterprises (SMEs) are acknowledged as the backbone for the county economy and Small and Medium Enterprises (SMEs) are acknowledged as the backbone to any economy as they are significant contributors to employment and economic growth[1]. Generally, SMEs account for the largest proportion of established businesses in most of the developing nations. As a developing country Sri Lanka has more than 80 percent employer firms, contributing to Gross Domestic Production (GDP) and generating more than 70 percent of employment [2]. Therefore, country economy has badly effected with the performance of SMEs in the country [3, 4].

Lack of using information and communication technologies is one of the main barriers to SME development. This is more critical when local organizations make difficulties to adopting to advance communication technologies with the respective industry[5-8].E-commerce evolution is related to rapid perfection of information technologies, the growing possibilities of their adoption in various areas, and the decrease of their usage cost and nowadays it not just to take a competitive advantage but as a necessity [9]. Further ICT based E-commerce provides many advantages to both buyer and seller in the business in globally[10]. According to [11]improve SME performance technology playing an important role in Sri Lanka. E-commerce is a technology used to do businesses in digital communication media and it integrates different business components together. Therefore, according to the literature studies the main research questions is compiled as determine the influence of Information Technology factors to the adoption of Electronic Commerce among Small and Medium Scale manufacturing enterprises in Sri Lanka and to identify the effects on organizational performance by adopting to Electronic Commerce. To address this main question following specific objectives are being identified to address. To address this main issue and sub-questions are as follows,

1. To investigate the Information Technology factors on Ecommerce adoption among manufacturing sector Small and Medium sector enterprises in Sri Lanka.
2. To measure the level of influence from Information Technology factors for adoption of electronic commerce in Small and Medium sector manufacturing enterprises in Sri Lanka.
3. To determine the influence of E-commerce adoption on organization performance.
4. To derive a model from Information technology factors to E-commerce adoption and E-commerce adoption to organization performance.

A questionnaire-based survey is conducted and modeled in Structural Equation Modeling (SEM). In the following section under methodology data collection and analysis part will be discussed in detail.

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II. Methodology

A questionnaire-based survey is conducted for data collection and modeled in Structural Equation Modeling (SEM). Initially, after data cleaning process reliability and validity of the data is checked and achieved the goodness of data and contracts under Exploratory Factor Analysis (EFA). Then Confirmatory Factor Analysis (CFA) is executing to check the model goodness of fit.

a) Structural Equation Modeling (SEM)

SEM is a collection of statistical techniques that can be used to confirm a theory hypothesized on a phenomenon[12, 13]. To confirm a theory. SEM is developing and validates a set of models consisting interrelated structural relationship among theoretical contracts and indicator variables [12]. The theoretical contracts refer to unobservable factors that are used to describe the phenomenon explained by the theory. Those theoretical contracts are represented by observable indicator variables [12]. In this study initially, Exploratory Factor Analysis (EFA) has been conducted and followed with Confirmatory Factor Analysis (CFA).

b) Exploratory Factor Analysis (EFA)

In this study relative advantage of the technology is identified as the main factor [10, 14-24] and is measured using 5 five items in questionnaire and Ease of use of the technology is measured as compatibility [10, 14, 15, 19, 21, 22, 25] and simplicity [3, 16, 21, 23, 26-29] and measured using four items. Further information and Network Security [7, 30-34] provided in the e-commerce solution is also found as a factor to be considered in e-commerce adoption. Which is measured using three items in the questionnaire-based investigation. Further the E-commerce adoption[14, 22, 35-39] and organization performance[20, 24, 40-44]

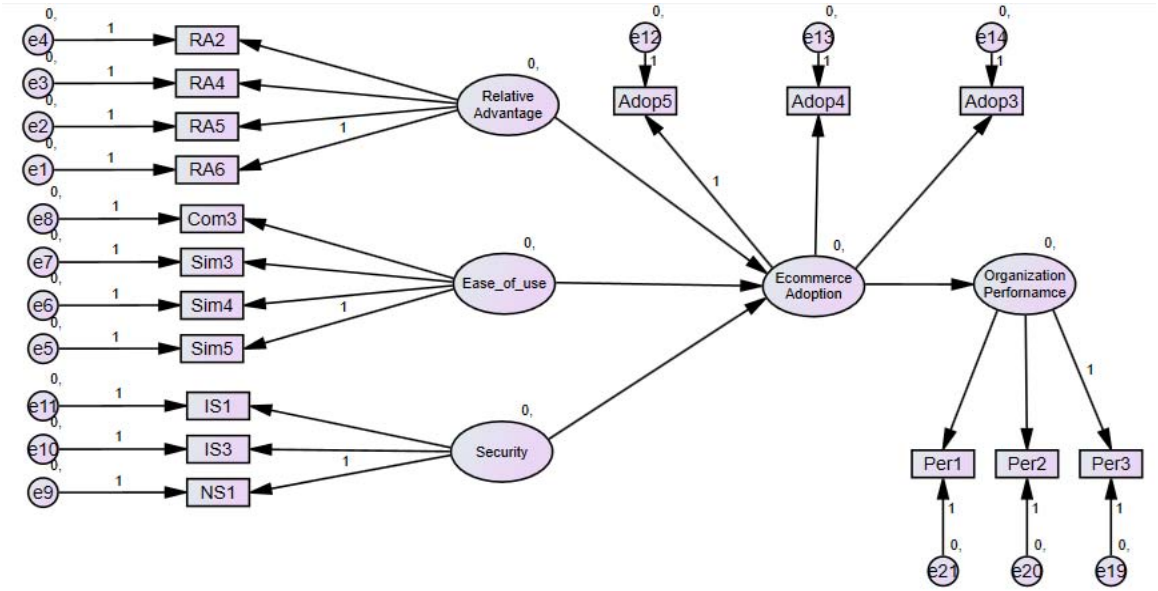

Figure I: Testable Framework

c) Data collection

For data collection, a questionnaire is developed according to the theoretical framework and validated through a pilot test. In the pilot test sample from the population, academic and industry respondents were used to collect data and modified the questionnaire according to the results of it. The sampling method of the study used is a non-propositional stratified random sampling. Unit of respondent is the owner for the SME or official nominated by the owner of the organization to represent the organization. Respondents of the study the study population is identified as the organizations under SME category are who are registered under Board of Industries (BOI) of Sri Lanka. BOI is the government-owned organization for SME industries in the county[45]. According to the industrial development board total population is 980[46]. According to [47]sample is 258 To get expected responses, 640 questionnaires were sent and 286 responses were received. Out of that responded with missing values and extreme answers 20 responses were removed and 266 responses were finalized for the analysis. The responding percentage is 44 percent.

III. Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis (CFA) is a sort of basic SEM model that works explicitly with measurement models; that is, the relationship between observed measures or indicators (e.g., test things, test scores, social perception appraisals) and latent factors or variables. The objective of latent variable measurement models (i.e., factor analysis) is to set up the number and nature of factors that represent the variety and

covariation among set of variables. A factor is an observable variable that impacts in excess of one observed measure and which represents the relationship among these observed measures. At the end, the observed measures are intercorrelated because they share a typical reason (i.e., they are impacted by the same fundamental construct); if the latent construct was partial led out, the intercorrelations among the observed measures would be zero. Along these lines, a measurement model, for example, CFA gives a more parsimonious understanding of the covariation among an indicator of markers in light of the fact that the number of factors is not exactly the estimated factors at the EFA[48].

According to the literature proposed framework showed in figure I. The study assessed the reliability of individual items by examining their internal consistency values through computing the construct reliability, Average Variance Extracted (AVE) and Cronbach's Alpha values. Table 1portrayed the reliability of the each of the constructs. This AVE values are extracted before the measurement model in SEM and this has been developed in the measurement model and followed with the structural model in CFA.

Table 1: AVE, CR and Cronbach's alpha for CFA

Construct	No. of Items	AVE	CR	Cronbach's Alpha
Organization Performance	3	0.690	0.869	0.867
Relative Advantage	4	0.525	0.815	0.813
Ease of Use	4	0.521	0.812	0.784
Security	3	0.578	0.803	0.774
E-commerce Adoption	3	0.535	0.774	0.767

The reliability of data is measured using Cronbach's alpha. It indicate the average intercorrelation between items and number of items [49].According to [12]and The Cronbach's Alpha value should exceed the threshold of 0.70. The results in Table I indicated that the construct reliability and it is acceptable. The next step is to examine the Composite Reliability (CR) as well as converged and discriminant validity. CR value is more than 0.774 in this study and according to [50] it should be more than 0.6 in order to achieve the minimum reliability and internal consistency of latent constructs. AVE should be more than 0.5for adequate the convergent validity [12]. In this analysis AVE is more than 0.50for each construct and it is acceptable. According to [50] the diagonal values (in bold) is the square root of AVE (as shown in table2) while other values are the correlation between the respective constructs. The discriminant validity for all constructs is achieved when a diagonal value (in bold) is higher than the values in its row and column. Therefore, in the study discriminate validity is achieved.

Table 2: Inter construct Correlation

	Relative_Advantage	Compatibility_Simplicity	Security	Adoption	Organization Performance	√AVE
Relative_Advantage	1.000	.588	.623	.457	.359	.831
Compatibility_Simplicity	.588	1.000	.722	.481	.132	.725
Security	.623	.722	1.000	.458	.191	.722
Adoption	.457	.481	.458	1.000	.203	.760
Organization Performance	.359	.132	.191	.203	1.000	.731

a) Measurement model

As statistics shows the goodness of data through table I, measurement model can be configured. Figure II shows the measurement model for the study. In this study absolute fit indicate using Root Mean Square Error Approximation (RMSEA) which is an index of the difference between observed covariance matrix which denote the model [51]. RAMSEA is a good fit indicator when the sample size is large. The incremental fit is measured using Comparative Fit Index (CFI). CFI is good even with a small sample and it assumes that all latent variables are uncorrelated (null/independence model) and compares the sample covariance matrix with this null model[52]. To test the parsimonies fit, mourned chi-squared is used. This is simple ratio of chi-squared to degree of freedom [12].

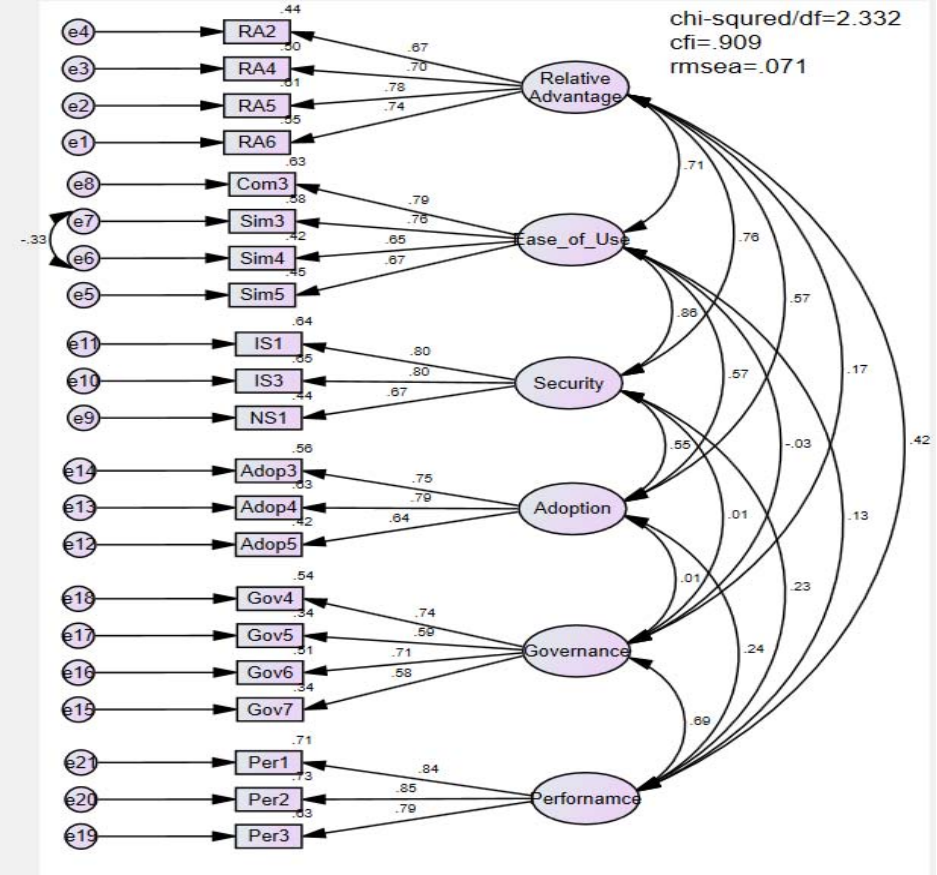

Figure II: Measurement Model

Goodness of the fit in the measurement model is measured using indicators in the table 2.

Table II: Summary of Fitness index

Validity Type	Criteria	Description	Literature
Absolute fit	RMSEA	Upper limit should be less than 0.08. is the good fit.	[12, 53, 54]
Incremental Fit	CFI	A cut-off criterion of CFI ≥ 0.90	[12, 55-57]
Parsimonious fit	Chi-square(X^2)/df	Less than 5.0	[50, 55]

According to the validity types and its upper limits this model is acceptable. Therefore, it is evident that relative advantage of the technology, Ease of use of the technology and Security of E-commerce is considered as significant factors to be consider in E-commerce adoption.

b) Structural Model

In the figure II, structural model of the study shows, and all the fit indexes are acceptable, and the model fit is achieved.

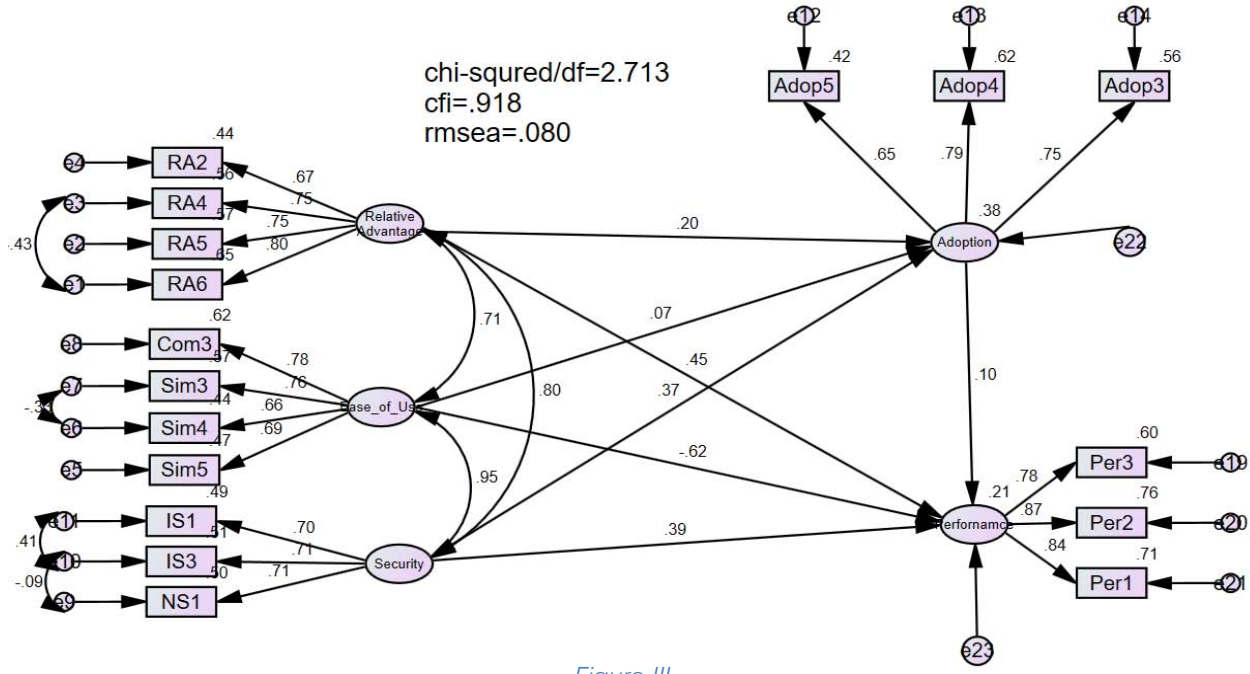

Figure III

According to the structural model it can see estimated coefficients are .20, .07 and .35 for Relative advantage, Ease of use and security respectively. The sizes of this coefficients are indicating that providing more security with the existing technical solutions has highest impact on adoption and relative advantage is Equation 01

average and ease of use has very small effect. Further .10 a small effect from E-commerce adoption to organization performance is indicated in the model. Therefor in this study if this study takes observed values for supervision following equations can be derived.

$$Y_{\text{E-commerce Adoption}} = 0.35(\text{Security}) + 0.20(\text{Relative Advantage}) + 0.07(\text{Ease of use})$$

Similarly, predicted values for Organization performance

$$Y_{\text{Organization performance}} = 0.10\ [\ (0.35(\text{Security}) + 0.20(\text{Relative Advantage}) + 0.07(\text{Ease of use})]$$

IV. Conclusion

Importance of SME development is significant for a developing country and it's is heavily integrated with the development of digital economy. A large proportion of digital economy depends on the level of adoption to ICT based E-commerce solutions. That enable countries to be more competitive in the respective market and access to global economies in all aspects. This paper explores the factors effecting to the adoption of E-commerce in specialized in Information Technology Factors in manufacturing sector SMEs in Sri Lanka. Research results show that SME sector industries have positive influence towards e-commerce adoption and it is affected by Information technology factors. Basically, Relative Advantage of the technology is identified as significant factor to be consider along with Ease of use to the e-commerce solution through compatibility of the existing technology and newly adopting technology and simplicity of the technology. According to results main barrier is identified as information and network security concerns when adopting to e-commerce solution. Therefore, providing a secure communication and building trust among uses or adopters in e-commerce will improve the adoption.

The limitations of the research can be observed in a small number of SME (N=266) as well as in the selected factors. In Sri Lankan context only, few SME industries are registered under Board of Industries as many industries are falling under Micro scale organization. Yet, since the SME owners that have participated in this research are those who have expressed interest in cooperation in this context, obtained results can be used for future research. Furthermore, feedback for the questionnaire is positive and responds were much satisfied with the quality and the content of the questionnaire. In this study there is no moderation effect is considered in the relationship between E-commerce adoption and organizational performance. But according to the literature proper governance of technology or e-commerce solution use would moderate the relationship and improv the organization performance.

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A Review on Human Gait Detection

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Abstract- The human gait is the identification of human locomotive based on limbs position or action. The tracking of human gait can help in various applications like normal and abnormal gait, fall detection, gender detection, age detection, biometrics and in some terrorist and criminal activity detection. The present work carried out is a review of various methodologies employed in human gait detection. The analysis describes that the different feature extraction and machine learning techniques to be adopted for the identification of human gait based on the purpose of the application.

Keywords: *human gait, biometrics, machine learning techniques, feature extraction.*

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AREVIEWONHUMANGAITDETECTION

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A Review on Human Gait Detection

Pavithra D S[α] & Shrishail Math[σ]

Abstract- The human gait is the identification of human locomotive based on limbs position or action. The tracking of human gait can help in various applications like normal and abnormal gait, fall detection, gender detection, age detection, biometrics and in some terrorist and criminal activity detection. The present work carried out is a review of various methodologies employed in human gait detection. The analysis describes that the different feature extraction and machine learning techniques to be adopted for the identification of human gait based on the purpose of the application.

Keywords: human gait, biometrics, machine learning techniques, feature extraction.

I. Introduction

Human gait describes bipedal, biphasic forward propulsion of the center of gravity of the human body which involves the movement of various parts of the body without any additional energy requirement. The gait pattern can be categorized based on the different limb movement.

The presented work is a survey carried out on human gait. The general steps involved in the human gait detection are the background subtraction, silhouette extraction, feature extraction and classification of gait based on the objective of the respective work carried out. On the whole, the gait detection can be generalized and can be represented pictorially as shown in figure 1.

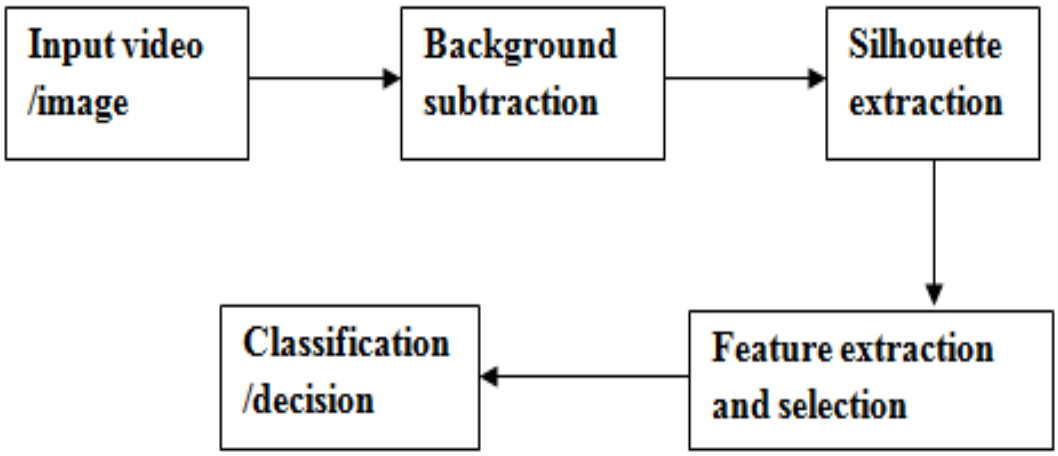

Figure 1: General Block diagram of a gait recognition system

The input to the gait recognition system is the video or the image captured from the camera. If video is the input, then it is subdivided into various frames and used as input to the gait recognition system. From the obtained image or video frame, the background is eliminated using some background subtraction methods. From that image, silhouette is extracted.

The silhouette extraction involves various methods like background subtraction, shadow removal, some morphological processes, etc. From the obtained silhouette the features are extracted. The extracted features are stride length, height, joint angle, etc. The complex feature extraction methods like PCA, LDA are used to extract prominent and essential features. The features selected play an important role in classification to make a decision of gait whether it is normal or abnormal.

II. Related Work

Kalyan Sasidhar and Satyam Satyajeet [1] proposed a wearable Smartphone based gait recognition system to detect normal and abnormal human walk. The limb movement is observed using the

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accelerometer inserted in the Smartphone. The data is acquired using an application AndroSensor. The runs on the phone remove noise; extracts peak and valley points in the signal. The features such as stride length, step length, speed, and cadence were extracted. For classification threshold based classification of computed metrics based on decision tree classifier is used. The decision categorizes them into normal, mild, moderate and severe class based on the extent of the abnormality.

In this work, the Smartphone eliminates the need of visiting the clinic and hospitals. The persons can clearly diagnose by themselves. Cheaper compared to other expensive medication methods and easily reachable to ordinary people, especially women who are busy with multiple tasks. The drawback of this proposed work is the device must be worn around the ankle which is difficult, and the wearable sensors are not suitable for aged people due to their forgetfulness, and it's not appropriate for large scale deployment.

B. S. Daga, A. A. Ghatol and V.M. Thakare [2] proposed a process in which the main objective of the work is to detect the fall detection. The camera footage was considered for the curvature scale space (CSS) features extraction, and the human activity is classified based on the support vector machine (SVM) extreme learning machine (ELM) technique. In this work, the advantage of the ELM along with sparse representation coefficient (SRC) is also discussed.

The high accuracy obtained from SRC classification. Faster computation and response time of the ELM technique. The disadvantage is subjected to physical space constraint. The system will be used in monitoring subject falls and being alone in the house or room cannot get attention or raise the alarm for immediate help.

Hoang Le Uyen Thuc, Pham Van Tuan and Jenq-Neng Hwang [3] proposed a work in which ordinary camera is used to capture the video of a person moving such as doing actions or walking. The human object is segmented using a GMM-based background subtraction algorithm. The extracted human is then post-processed via morphology operations to create a well defined binary silhouette. Feature representation using two separate feature descriptors, one for each application scenario, and shape-based feature descriptor is good enough to represent the gait. Seven values of Hu's moments were used as features. The abnormal event detected based on Hidden Markov Model (HMM). The final stage is to convey an SMS message to the pre-defined cell phone number to notify the caregiver of a detected anomaly.

The installation, operation, and maintenance of the camera systems are simple. It is also non-intrusive, continuous, and objective in nature. But it is subjected to space constraints and can be an Automatic fall detection system to timely support the victims.

Zijuan Liu, Lin Wang, Wenyuan Liu and Binbin Li [4] proposed discrete wavelet transform (DWT) and principal component analysis (PCA) algorithms are used to remove noise. The two-dimensional CSI frames are built using the amplitude information of CSI subcarriers for extracting feature of CSI subcarriers. The SVM classifier is used to classify the CSI data. If there is a human movement, the gait periodicity is analyzed using autocorrelation to identify whether the intruder is human or not.

Since WiFi is available widely, this system can be adopted to detect the intruder easily.

Mohammed Hussein Ahmed and Azhin Tahir Sabir [5] proposed a gait-based gender classification method using the 3D skeleton data obtained from the Microsoft Kinect sensor. A Kinect sensor supported with SDK provides a human skeleton for two people. Kinect provides an RGB image and image depth. However, in the proposed method the author uses only a skeleton model. The proposed method consists of four stages. The first stage is the creation of an application by SDK for Windows to record a 3D skeleton, which is then used to create a database with Kinect. Detecting a gait cycle for each subject is the second stage. The third stage involves feature extraction - in this paper, the skeleton-based dynamic feature extraction method is adopted. In the final phase, the Nearest Neighbor (NN), Support Vector Machines (SVM) and Linear Discriminant Classifier (LDC) were used as the classification methods.

The human gender is easily classified without any human intervention. The information is collected through non-contact and non-invasive methods.

Ait O. Lishani, Larbi Boubchir and Emad Khalifa and Ahmed Bouridane [6] describe GEI which represents human walk using a single grayscale image obtained by averaging the silhouettes extracted over one gait cycle. The features of the GEI image is extracted using Gabor filter bank-based feature extraction method. To obtain useful and informative features for classification a Spectral Regression Kernel Discriminant Analysis (SRKDA) feature reduction algorithm is necessary. The SVM classifier is used to evaluate the categorization.

The recognition rate of the proposed method is high compared to other existing methods. Hence it can be a promising system in biometric applications.

Guan Y.D, Zhu R.F., Feng J. Y, Du, K., Zhang and X.R. [7] establishes the human silhouette and gait period. The author has adopted Shifting Energy Image (SEI) as the feature of the image, and then Gabor Wavelet and Local Binary Pattern (LBP) feature extraction methods are applied. Finally, gait feature will be classified and recognized by using sparse representation coefficients (SRC). The robustness of the system is high.

Sneha Choudhary, Chandra Prakash and Rajesh Kumar [8] proposed a method consists of four steps. Gait Energy Image (GEI) is obtained by normalizing and averaging all the silhouette images in one gait cycle for all the subjects. The dimension of the GEI image is reduced by using principal component analysis. Five spatiotemporal parameters namely cadence, speed, height, stride length, stance period are calculated and concatenated with the reduced GEI Image. The reduced feature vector set is trained and tested using support vector machine and artificial neural network to classify whether it is male or female. The human recognition can be done from a far distance.

Nabeel Seedat, David Beder, Vered Aharonson and Steven Dubowsky [9] compare the force sensor based and accelerometer based motion monitoring system. The empirical mode decomposition (EMD) method is used to decompose, filter and reconstruct the respective kinematic signals. The threshold based peak detection is applied to estimate potential footfalls. The accelerometer sensor based system accuracy is good compared to the force sensor based system.

Wei-Yi Cheng, Florian Lipsmeier, Alf Scotland and Andrew Creagh [10] provide the continuous monitoring of the Parkinsons disease (PD) patients and motion monitoring. The sensor data for above 30000 hours were used. The convolution recurrent neural network was employed for human activity detection along with the extracted features.

The gait monitoring system is a promising system in the field of biometrics such as fingerprint, iris, DNA, and face. The consideration of gait for biometric would be advantageous compared to the existing one as the gait cannot be forged, and it is unique for each. Gait detection can play a significant role in the criminal and terrorist activities monitoring as they operate from a far distance. Since the gait detection doesn't involve any human contact, it can be analyzed from a considerable distance. Other than these the gait recognition would help in gender classification, age classification, fall detection and monitoring the aged people.

III. Gait Phases and Parameters

The complete gait cycle has two phases: the stance phase and the swing phase. The stance phase consists the time when the foot is in contact with the floor and the swing phase when the foot is in the air. Each gait phase is associated with the sub-phases such as initial contact, loading response, mid stance, terminal stance, and pre-swing. The swing phases are an initial swing, mid swing, and terminal swing.

Initial contact (heel strike): It is the moment that the foot contacts the ground.

Loading response: This phase begins immediately after the initial contact of the foot and continues until the lift of limb for swing phase.

Mid-stance: Period starts from the lift of the contralateral limb from the ground to the point where the body weight is aligned with the forefoot.

Terminal stance: This period starts after heel rising in the frontal plane and continues to prior to the initial contact of the contralateral limb.

Pre-swing: This phase starts from initial contact of the contralateral limb and ends with the lift of the ipsilateral limb from the ground.

Swing phase

Initial swing: This phase, also called toe off, is from lifting the foot off the ground until the knee flexion is increased to its maximum position.

Mid-swing: This phase begins immediately after knee flexion and ends when the tibia is vertical.

Terminal swing: This phase begins following the vertical tibia position to just before the initial contact.

The gait parameters can be listed as Cadence, Cycle frequency, Gait cycle time, Gait irregularity, Gait variability, Root mean square, Stance duration, Step asymmetry, Step duration, Step frequency, Step length, Step width, Stride duration, Stride frequency, Stride length, Stride velocity, Swing duration, Walking distance, Walking intensity, Walk ratio, Walking (gait) speed, Walking time and Walking velocity.

Cadence: Total number of completed steps or number of strides per minute.

Cycle frequency: The frequency obtained by performing the discrete Fourier transforms (DFT).

Gait cycle time: Time duration between two successive heel- strike events.

Gait irregularity: The average SDs of the left and right step times. It shows the variability in successive steps of the same foot.

Gait variability: The SD of gait parameters or their coefficient of variation (CV) i.e.

CV = SD/mean which is based on stride to stride fluctuations.

Root mean square: Root Mean Square (RMS) of the acceleration magnitudes.

Stance duration: The time from heel strike to toe off of the same foot. It is a percentage of the gait cycle.

Step asymmetry: The ratio of the difference between mean step times of individual legs to the combined mean step time of both feet.

Step duration: The time between heel contacts of the opposite foot.

Step frequency: Half of the fundamental frequency calculated using DFT.

Step length: Ratio of covered distance in meters to the number of completed steps.

Step width: Distance between the heels in the double support phase.

Stride duration: The time between two consecutive heel strikes of the same foot.

Stride frequency: Number of cycles per second (Hz).

Stride length: The distance between two consecutive heel strikes of the same foot.

Stride velocity: Ratio of the stride length to stride time.

Swing duration: The time from toe-off to heel strike of the same foot that can also be expressed a percentage of gait cycle.

Walking distance: Multiplication of mean step length over a specified duration by the number of steps.

Walking intensity: Calculated from the integral of the modulus accelerometer output.

Walk ratio: The ratio of average step length (in cm) to the cadence.

Walking (gait) speed: Having distance divided by the walking time.

Walking time: Measured using a stop watch.

Walking velocity: Distance covered/number of data points/sampling frequency.

Figure 2 shows the extracted silhouette from the original images after the morphological processes.

Figure 2: Original images and corresponding binary silhouette images [3]

Figure 3 depicts the GEI extraction. The GEI is the average of all the normalized images for the single gait cycle. The last section of the figure 3 shows the gait energy image (GEI).

Figure 3: Normalized and aligned images. The last image corresponds to Gait Energy Image [8]

The human gait is affected based on the weight the person is carrying. The variations in human gait during a normal walk is shown in fig 4 (a), while carrying bag is in fig 4 (b) and while wearing a coat is in fig 4(c).

Figure 4: (a) Normal walk (b) Carrying-bag (c) Wearing-coat

Figure.4. An example of GEI of an individual under three different conditions [6].

The human gait cycle is a significant parameter in the gait analysis. Figure 5 represents how the gait cycle can be identified.

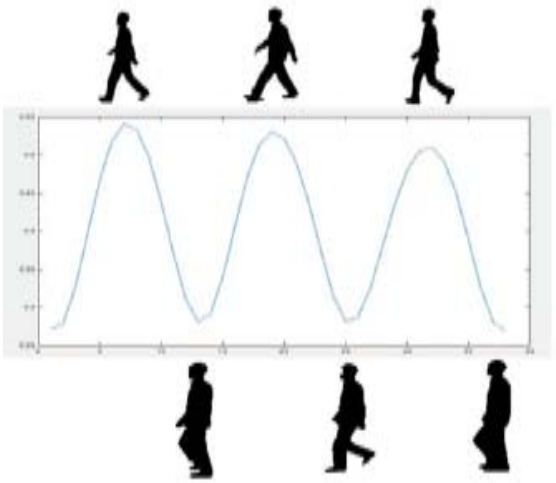

Figure 5: Identification of Gait cycle [8]

Figure 6 is the representation of the period of the human gait. It describes the period of human gait from CASIA-B dataset.

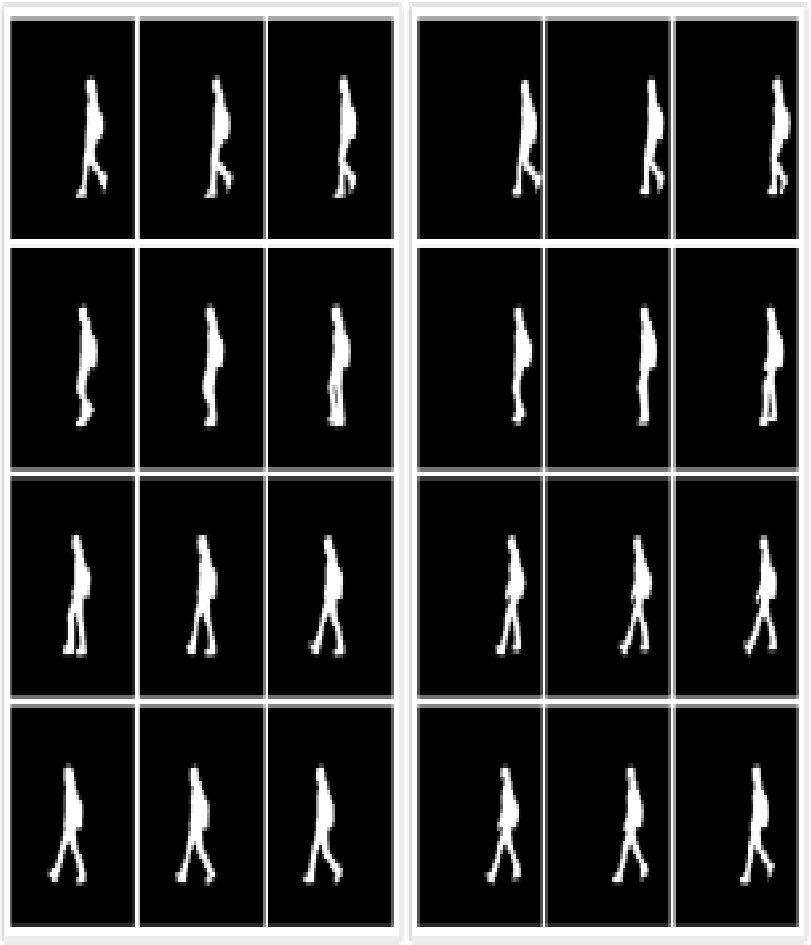

Figure 6: The period of human gait from CASIA-B dataset [7]

IV. Results and Discussion

The table1 shows the summary of the reviewed methodologies and their important parameters for gait analysis.

The table2 shows the tabulation of the reviewed methodologies based on the applications. Other than this the human gait detection has applications in sport, computer games, physical rehabilitation, clinical assessment, surveillance, human recognition, modeling, and many other fields.

Table 1: Summary of various approaches and their parameters for gait detection

Sl. No.	Author	Year	Accuracy (%)	Complexity	Classifier	Dataset
1	Kalyan Sasidhar, Satyam Satyajeet	2017	90	Low	Decision tree classifier	Real time Accelerometer sensor data
2	B. S. Daga, A. A. Ghatol, V.M.Thakare	2017	99.6	High	ELM-SRC	Data from Microsoft XBOX gaming console
3	Hoang Le Uyen Thuc, Pham Van Tuan and Jenq-Neng Hwang	2017	93.24	Low	HMM	HBU-Le2i
4	Zijuan Liu, Lin Wang, Wenyuan Liu and Binbin Li	2016	94	Low	SVM	CISCO WRVS4400N wireless router is used as AP to transmitter data. Intel 5300 NICs is used as MP to receive data
5	Mohammed Hussein Ahmed, Azhin Tahir Sabir	2017	96.67, 91, 90	High Low Low	NN LDC SVM	Data from Kinect sensor
6	Ait O. Lishani, Larbi Boubchir, Emad Khalifa and Ahmed Bouridane	2016	91	Low	SVM	CASIA Gait database (dataset B)
7	Guan Y.D, Zhu R.F., Feng J. Y, Du, K., Zhang, X.R.	2016	99	High	SRC	CASIA Gait database B
8	Sneha Choudhary, Chandra Prakash, Rajesh Kumar	2017	98.16	High	SVM	CASIA Gait database B
9	Nabeel Seedat, David Beder, Vered Aharonson and Steven Dubowsky	2018	86	Low	EMD	PAMMII
10	Wei-Yi Cheng, Florian Lipsmeier, Alf Scotland and Andrew Creagh	2017	90	Mid	CNN	PRX002/RG7935

Table 2: Segregation of the methods based on the applications

Sl. No.	Application	Methods/Papers
1	Normal and Abnormal gait analysis	A Smartphone based personalized gait diagnosing system[1]
2	Fall and Position detection	[2],[3],[4],[9]
3	Gender detection	[5],[8]
4	Terrorist or Criminal activity monitoring	[5]
5	Medical applications	[1],[10]
6	Biometrics	[6],[7]

V. Conclusion

The work presented is a literature review work on human gait recognition. The silhouette extraction, feature extraction, and classification are the main steps involved in the gait recognition. The various methods were presented by the authors and all are reviewed in this work.

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Once you are designated as FARSS, you may send us a scanned copy of all of your credentials. OARS will verify, grade and certify them. This will be based on your academic records, quality of research papers published by you, and some more criteria. After certification of all your credentials by OARS, they will be published on your Fellow Profile link on website https://associationofresearch.org which will be helpful to upgrade the dignity.

The FARSS members can avail the benefits of free research podcasting in Global Research Radio with their research documents. After publishing the work, (including published elsewhere worldwide with proper authorization) you can upload your research paper with your recorded voice or you can utilize chargeable services of our professional RJs to record your paper in their voice on request.

The FARSS member also entitled to get the benefits of free research podcasting of their research documents through video clips. We can also streamline your conference videos and display your slides/ online slides and online research video clips at reasonable charges, on request.

The FARSS is eligible to earn from sales proceeds of his/her researches/reference/review Books or literature, while publishing with Global Journals. The FARSS can decide whether he/she would like to publish his/her research in a closed manner. In this case, whenever readers purchase that individual research paper for reading, maximum 60% of its profit earned as royalty by Global Journals, will be credited to his/her bank account. The entire entitled amount will be credited to his/her bank account exceeding limit of minimum fixed balance. There is no minimum time limit for collection. The FARSS member can decide its price and we can help in making the right decision.

The FARSS member is eligible to join as a paid peer reviewer at Global Journals Incorporation (USA) and can get remuneration of 15% of author fees, taken from the author of a respective paper. After reviewing 5 or more papers you can request to transfer the amount to your bank account.

MEMBER OF ASSOCIATION OF RESEARCH SOCIETY IN SCIENCE (MARSS)

The ' MARSS ' title is accorded to a selected professional after the approval of the Editor-in-Chief / Editorial Board Members/Dean.

The “MARSS” is a dignified ornament which is accorded to a person’s name viz. Dr. John E. Hall, Ph.D., MARSS or William Walldroff, M.S., MARSS.

MARSS accrediting is an honor. It authenticates your research activities. After becoming MARSS, you can add 'MARSS' title with your name as you use this recognition as additional suffix to your status. This will definitely enhance and add more value and repute to your name. You may use it on your professional Counseling Materials such as CV, Resume, Visiting Card and Name Plate etc.

The following benefitscan be availed by you only for next three years from the date of certification.

MARSS designated members are entitled to avail a 25% discount while publishing their research papers (of a single author) in Global Journals Inc., if the same is accepted by our Editorial Board and Peer Reviewers. If you are a main author or co-author of a group of authors, you will get discount of 10%.

As MARSS, you will be given a renowned, secure and free professional email address with 30 GB of space e.g. johnhall@globaljournals.org. This will include Webmail, Spam Assassin, Email Forwarders,Auto-Responders, Email Delivery Route tracing, etc.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time. This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

The MARSC member can apply for approval, grading and certification of standards of their educational and Institutional Degrees to Open Association of Research, Society U.S.A.

Once you are designated as MARSC, you may send us a scanned copy of all of your credentials. OARS will verify, grade and certify them. This will be based on your academic records, quality of research papers published by you, and some more criteria.

It is mandatory to read all terms and conditions carefully.

Auxiliary Memberships

Institutional Fellow of Open Association of Research Society (USA)-OARS (USA)

Global Journals Incorporation (USA) is accredited by Open Association of Research Society, U.S.A (OARS) and in turn, affiliates research institutions as "Institutional Fellow of Open Association of Research Society" (IFOARS).

The "FARSC" is a dignified title which is accorded to a person's name viz. Dr. John E. Hall, Ph.D., FARSC or William Walldroff, M.S., FARSC.

The IFOARS institution is entitled to form a Board comprised of one Chairperson and three to five board members preferably from different streams. The Board will be recognized as "Institutional Board of Open Association of Research Society"-(IBOARS).

The Institute will be entitled to following benefits:

The IBOARS can initially review research papers of their institute and recommend them to publish with respective journal of Global Journals. It can also review the papers of other institutions after obtaining our consent. The second review will be done by peer reviewer of Global Journals Incorporation (USA) The Board is at liberty to appoint a peer reviewer with the approval of chairperson after consulting us.

The author fees of such paper may be waived off up to 40%.

The Global Journals Incorporation (USA) at its discretion can also refer double blind peer reviewed paper at their end to the board for the verification and to get recommendation for final stage of acceptance of publication.

The IBOARS can organize symposium/seminar/conference in their country on behalf of Global Journals Incorporation (USA)-OARS (USA). The terms and conditions can be discussed separately.

The Board can also play vital role by exploring and giving valuable suggestions regarding the Standards of "Open Association of Research Society, U.S.A (OARS)" so that proper amendment can take place for the benefit of entire research community. We shall provide details of particular standard only on receipt of request from the Board.

The board members can also join us as Individual Fellow with 40% discount on total fees applicable to Individual Fellow. They will be entitled to avail all the benefits as declared. Please visit Individual Fellow-sub menu of GlobalJournals.org to have more relevant details.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time. This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

After nomination of your institution as "Institutional Fellow" and constantly functioning successfully for one year, we can consider giving recognition to your institute to function as Regional/Zonal office on our behalf.
The board can also take up the additional allied activities for betterment after our consultation.

The following entitlements are applicable to individual Fellows:

Open Association of Research Society, U.S.A (OARS) By-laws states that an individual Fellow may use the designations as applicable, or the corresponding initials. The Credentials of individual Fellow and Associate designations signify that the individual has gained knowledge of the fundamental concepts. One is magnanimous and proficient in an expertise course covering the professional code of conduct, and follows recognized standards of practice.

Open Association of Research Society (US)/ Global Journals Incorporation (USA), as described in Corporate Statements, are educational, research publishing and professional membership organizations. Achieving our individual Fellow or Associate status is based mainly on meeting stated educational research requirements.

Disbursement of 40% Royalty earned through Global Journals : Researcher = 50%, Peer Reviewer = 37.50%, Institution = 12.50% E.g. Out of 40%, the 20% benefit should be passed on to researcher, 15 % benefit towards remuneration should be given to a reviewer and remaining 5% is to be retained by the institution.

We shall provide print version of 12 issues of any three journals [as per your requirement] out of our 38 journals worth $ 2376 USD.

Other:

The individual Fellow and Associate designations accredited by Open Association of Research Society (US) credentials signify guarantees following achievements:

- The professional accredited with Fellow honor, is entitled to various benefits viz. name, fame, honor, regular flow of income, secured bright future, social status etc.

- In addition to above, if one is single author, then entitled to 40% discount on publishing research paper and can get 10%discount if one is co-author or main author among group of authors.
- The Fellow can organize symposium/seminar/conference on behalf of Global Journals Incorporation (USA) and he/she can also attend the same organized by other institutes on behalf of Global Journals.
- The Fellow can become member of Editorial Board Member after completing 3yrs.
- The Fellow can earn 60% of sales proceeds from the sale of reference/review books/literature/publishing of research paper.
- Fellow can also join as paid peer reviewer and earn 15% remuneration of author charges and can also get an opportunity to join as member of the Editorial Board of Global Journals Incorporation (USA)
- • This individual has learned the basic methods of applying those concepts and techniques to common challenging situations. This individual has further demonstrated an in–depth understanding of the application of suitable techniques to a particular area of research practice.

Note :

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- In future, if the board feels the necessity to change any board member, the same can be done with the consent of the chairperson along with anyone board member without our approval.
- In case, the chairperson needs to be replaced then consent of 2/3rd board members are required and they are also required to jointly pass the resolution copy of which should be sent to us. In such case, it will be compulsory to obtain our approval before replacement.
- In case of "Difference of Opinion [if any]" among the Board members, our decision will be final and binding to everyone.

"

Preferred Author Guidelines

We accept the manuscript submissions in any standard (generic) format.

We typeset manuscripts using advanced typesetting tools like Adobe In Design, CorelDraw, TeXnicCenter, and TeXStudio. We usually recommend authors submit their research using any standard format they are comfortable with, and let Global Journals do the rest.

Alternatively, you can download our basic template from https://globaljournals.org/Template.zip

Authors should submit their complete paper/article, including text illustrations, graphics, conclusions, artwork, and tables. Authors who are not able to submit manuscript using the form above can email the manuscript department at submit@globaljournals.org or get in touch with chiefeditor@globaljournals.org if they wish to send the abstract before submission.

Before and during Submission

Authors must ensure the information provided during the submission of a paper is authentic. Please go through the following checklist before submitting:

1. Authors must go through the complete author guideline and understand and *agree to Global Journals' ethics and code of conduct,* along with author responsibilities.
2. Authors must accept the privacy policy, terms, and conditions of Global Journals.
3. Ensure corresponding author's email address and postal address are accurate and reachable.
4. Manuscript to be submitted must include keywords, an abstract, a paper title, co-author(s') names and details (email address, name, phone number, and institution), figures and illustrations in vector format including appropriate captions, tables, including titles and footnotes, a conclusion, results, acknowledgments and references.
5. Authors should submit paper in a ZIP archive if any supplementary files are required along with the paper.
6. Proper permissions must be acquired for the use of any copyrighted material.
7. Manuscript submitted *must not have been submitted or published elsewhere* and all authors must be aware of the submission.

Declaration of Conflicts of Interest

It is required for authors to declare all financial, institutional, and personal relationships with other individuals and organizations that could influence (bias) their research.

Policy on Plagiarism

Plagiarism is not acceptable in Global Journals submissions at all.

Plagiarized content will not be considered for publication. We reserve the right to inform authors' institutions about plagiarism detected either before or after publication. If plagiarism is identified, we will follow COPE guidelines:

Authors are solely responsible for all the plagiarism that is found. The author must not fabricate, falsify or plagiarize existing research data. The following, if copied, will be considered plagiarism:

- Words (language)
- Ideas
- Findings
- Writings
- Diagrams
- Graphs
- Illustrations
- Lectures

- Printed material
- Graphic representations
- Computer programs
- Electronic material
- Any other original work

Authorship Policies

Global Journals follows the definition of authorship set up by the Open Association of Research Society, USA. According to its guidelines, authorship criteria must be based on:

1. Substantial contributions to the conception and acquisition of data, analysis, and interpretation of findings.
2. Drafting the paper and revising it critically regarding important academic content.
3. Final approval of the version of the paper to be published.

Changes in Authorship

The corresponding author should mention the name and complete details of all co-authors during submission and in manuscript. We support addition, rearrangement, manipulation, and deletions in authors list till the early view publication of the journal. We expect that corresponding author will notify all co-authors of submission. We follow COPE guidelines for changes in authorship.

Copyright

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Appealing Decisions

Unless specified in the notification, the Editorial Board's decision on publication of the paper is final and cannot be appealed before making the major change in the manuscript.

Acknowledgments

Contributors to the research other than authors credited should be mentioned in Acknowledgments. The source of funding for the research can be included. Suppliers of resources may be mentioned along with their addresses.

Declaration of funding sources

Global Journals is in partnership with various universities, laboratories, and other institutions worldwide in the research domain. Authors are requested to disclose their source of funding during every stage of their research, such as making analysis, performing laboratory operations, computing data, and using institutional resources, from writing an article to its submission. This will also help authors to get reimbursements by requesting an open access publication letter from Global Journals and submitting to the respective funding source.

Preparing your Manuscript

Authors can submit papers and articles in an acceptable file format: MS Word (doc, docx), LaTeX (.tex, .zip or .rar including all of your files), Adobe PDF (.pdf), rich text format (.rtf), simple text document (.txt), Open Document Text (.odt), and Apple Pages (.pages). Our professional layout editors will format the entire paper according to our official guidelines. This is one of the highlights of publishing with Global Journals—authors should not be concerned about the formatting of their paper. Global Journals accepts articles and manuscripts in every major language, be it Spanish, Chinese, Japanese, Portuguese, Russian, French, German, Dutch, Italian, Greek, or any other national language, but the title, subtitle, and abstract should be in English. This will facilitate indexing and the pre-peer review process.

The following is the official style and template developed for publication of a research paper. Authors are not required to follow this style during the submission of the paper. It is just for reference purposes.

Manuscript Style Instruction (Optional)

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27" x 11'", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
- The names of second main headings (Heading 2) must not include numbers and must be in italics with a font size of 10.

Structure and Format of Manuscript

The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

a) A title which should be relevant to the theme of the paper.
b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
d) An introduction, giving fundamental background objectives.
e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition, sources of information must be given, and numerical methods must be specified by reference.
f) Results which should be presented concisely by well-designed tables and figures.
g) Suitable statistical data should also be given.
h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

i) Discussion should cover implications and consequences and not just recapitulate the results; conclusions should also be summarized.
j) There should be brief acknowledgments.
k) There ought to be references in the conventional format. Global Journals recommends APA format.

Authors should carefully consider the preparation of papers to ensure that they communicate effectively. Papers are much more likely to be accepted if they are carefully designed and laid out, contain few or no errors, are summarizing, and follow instructions. They will also be published with much fewer delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and suggestions to improve brevity.

Format Structure

It is necessary that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

All manuscripts submitted to Global Journals should include:

Title

The title page must carry an informative title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) where the work was carried out.

Author details

The full postal address of any related author(s) must be specified.

Abstract

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Keywords

A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy: planning of a list of possible keywords and phrases to try.

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, “What words would a source have to include to be truly valuable in a research paper?” Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

Numerical Methods

Numerical methods used should be transparent and, where appropriate, supported by references.

Abbreviations

Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

Formulas and equations

Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

Tables, Figures, and Figure Legends

Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.

Figures

Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

Preparation of Eletronic Figures for Publication

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution at final image size ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs): >350 dpi; figures containing both halftone and line images: >650 dpi.

Color charges: Authors are advised to pay the full cost for the reproduction of their color artwork. Hence, please note that if there is color artwork in your manuscript when it is accepted for publication, we would require you to complete and return a Color Work Agreement form before your paper can be published. Also, you can email your editor to remove the color fee after acceptance of the paper.

Tips for writing a good quality Computer Science Research Paper

Techniques for writing a good quality computer science research paper:

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

4. Use of computer is recommended: As you are doing research in the field of computer science then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.

6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10.Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.

Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
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Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

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This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
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- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

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- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

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Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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