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The Role of Esports in Developing Problem-Solving and Decision-Making Skills among Hail University Students

Wadha Shabib Ali Alotaibi*
Department of Curriculum and Teaching Methods,
College of Education, Hail University
Saudi Arabia

Abstract. As Information Technology and Artificial Intelligence have made deep inroads into all aspects of human life, they have taken over the entertainment industry, too. Playing video games is one of the major sources of entertainment for the young generation today. However, it is claimed that the impact of video games goes beyond mere entertainment, and that playing video games proves helpful in developing certain soft skills, such as language skills, problem-solving, and decision-making skills. The present paper is an outcome of a research study conducted to examine the impact of playing video games on the development of problem-solving and decision-making skills of adult learners. In a qualitative study using survey questionnaire and structured interviews as research tools, 60 university students participated to share their perceptions on the impact of video games on their problem-solving and decision-making skills. Afterwards, in structured interview sessions, a smaller cohort of 10 students expressed their opinions on the ways they transfer the skills gained by playing video games to real-life situations. The findings of the study show that playing video games helps develop certain transferrable soft skills among adult players. The findings are significant from both academic and social perspective as problem-solving and decision-making are the sought after skills in the present-day job market.

Keywords: video games; soft skills; problem-solving; decision-making; artificial intelligence

1. Introduction

The intervention of Information Technology and Artificial Intelligence (AI) in the sports and games environment has paved the way for an altogether different use of these playthings, such that these action-packed sportive activities were not primarily intended for (Baltezarević & Baltezarević, 2019). The foremost purpose

*Corresponding author: Wadha Shabib Ali Alotaibi; *w.alotabi@uoh.edu.sa*

of the video games industry was economic gain, and the social perception of online gaming was that young gamers were wasting their valuable time in useless indulgence. However, soon a useful benefit of the games came to the notice of observers. It was noticed that video gamers had an edge over non-gamers as regards problem-solving and decision-making in real-life situations (Dale & Green, 2017). This significant point initiated a flurry of research activities on the cognitive use and importance of video games for young gamers. Research studies on the subject showed that video games did play a role in the development of a few soft skills among gamers, problem-solving and decision-making being among them (Granic et al., 2014). The findings attracted the attention of academic researchers since problem-solving and decision-making are skills that every learner should possess, as they are highly valued in the job market. In course of time, the entertainment programmes evolved into edutainment programmes generating purposeful academic interest, and now video games are included into academic curricula, too (Almusharraf, 2021; Hobbs et al., 2006).

The academic use of entertainment programmes is founded on two basic principles of learning. First, learning is easy if the learning process is fun, and the subject of learning sustains a learner's interest. Second, certain skills are common between fun activities and learning, so, if the skills in use in the fun activities can be transferred to learning activities, learner interest can be sustained in learning even boring things. Video games and esports are fun and entertaining in a way that they can sustain individual interest for long (Chapman & Rich, 2018). The use of esports and video games as learning aids can make the otherwise boring educational learning activities easy by sustaining learner interest for long (Ahmed et al., 2022).

In the digital age, video games have come to be a new edutainment medium (Bennacer, 2022). Playing games for entertainment involves dexterity at coordination skills, such as perfect coordination of hands and eye movement with quick thinking, and the use of certain soft skills, such as grit, determination, winning spirit, facing challenges, problem-solving and decision-making (Green & Bavelier, 2003). These skills are transferrable to other fields of human activities, such as learning and solving real-life issues. These two common features of esports and video games have made them ideal learning aids, and research studies on the impact of esports and video games on learning have shown promising results (Chan & Lo, 2024; Darvenkumar & Rajasekaran, 2023).

1.1 Research Background

A casual survey conducted with young people, particularly university undergraduate students, showed that the most popular esports and video games among young people are System Shock 2, Deus Ex, Pikmin, Rise of Nations, Neverwinter Nights, and PUBG. System Shock 2 is a video game whose incidents take place on board a starship. A genetic infection has devastated the starship, and the player takes the role of a soldier who is to tackle the outbreak of the malaise. It involves exploration, combat, problem-solving and decision-making. Deus Ex is also a role-playing video game. The setting of the game is near-future and dystopian. The action involves solving conflicts between the forces that want to

control the world and the effects of transhumanism and technology-oriented power. Pikmin, on the other hand, is a puzzle video game. The player needs to direct a whole lot of plant-like creatures named Pikmin who help the player collect the required items in exploration. However, the process of collecting the items is hazardous and full of obstacles. So, the game needs action, quick thinking and problem-solving. Rise of Nations is a strategy game. The story features history and rise of civilisations, and the game is centred around the concept of "Territory." Players control, defend, and expand their territory gathering a number of resources that are infinite in supply. Thus, the players use problem-solving and decision-making along with dexterity at certain skills. Neverwinter Nights takes place in the city of Neverwinter. In one game, the city is ruined by a magical plague called Wailing Death, while in the second game the city is threatened by invasion. The player assumes a role in the game.

PUBG: Battlegrounds (Player Unknown's Battle Grounds) is a 2017 battle royale video game published by Krafton and developed by Krafton's PUBG Studios. It is a player versus player shooter game in which up to one hundred players fight in a battle royale, a type of large-scale last man standing deathmatch where players fight to remain the last alive. Thus, the game involves problem-solving and decision-making skills. Players can choose to enter the match solo, duo, or with a small team of up to four people. The researcher interacted with Saudi students who revealed that they generally played PUBG, and most commonly, they played the game solo or duo.

Features of the games that are common to all of them, and that sustain players' interest in the games, are as follows:

- Sci-fi content or content related to the latest technology, like the ones shown in latest sci-fi films
- Portmanteau words specifically related to the latest technical innovations
- Players' control over progression (Players are in command; so, they can manipulate the things in their favour)
- Exploration (finding something new and interesting)
- Destroying hurdles in the way, avoiding hazards and dangerous situations / creatures
- What next curiosity (The narratives sustain players' curiosity)
- Making decisions (Players decide their next moves)

Physical/mental dexterity and a combination of transferrable skills involved in playing these games have prompted educationists to exploit video games as learning aids (de Freitas, 2018). Researchers have either exploited certain features of video games to hone learners' skills primarily involved in playing a particular game, or they have exploited the concept of "gamification" to make learning activities more interesting for the young learners (Gyaurov et al., 2022; Zhang & Hasim, 2023). Esports and video games also bear the potential to be exploited as language learning aids for foreign language learners in non-native conditions (Han et al., 2024). With the help of certain add-ons, the games can be enhanced to help language learners, sustaining learners' interest in the activity at the same time (Hung & Young, 2015).

1.2 Research Problem

A preliminary review of existing literature on the topic shows that the concept of gamification has been experimented with to enhance the teaching of language elements, such as vocabulary and sentence structure to foreign language learners (Barcomb & Cardoso, 2020; Calvo-Ferrer & Belda-Medina, 2021; Hwang et al., 2024; Xu et al., 2020). Similarly, a few esports and video games have been tested in classroom situations to investigate whether they enhance learners' soft skills, such as problem-solving and decision-making (Eseryel et al, 2014; Prensky, 2001; Xu et al., 2022).

These skills are transferrable to a teaching / learning environment and can be useful as significant life skills. Real-life situations require these skills and recruiters look for them in their talent pool. Also, there is ample research on the impact of video games on the enhancement of players' grit and determination, the individual characteristic features significant for human success in various enterprises (Aparicio et al., 2017; Duckworth et al., 2007; Zhong et al., 2022).

Nevertheless, research studies investigating the impact of video games on the development of soft skills, such as problem-solving and decision-making, have been confined to only a few specific, more popular, games, such as System Shock 2, Deus Ex, Pikmin, and Rise of Nations, whereas the impact of some other games, such as PUBG, on the same skills has skipped the attention of researchers, and therefore, research literature on the impact of these games on soft skills development is almost negligible.

Moreover, the available studies are confined to research subjects from some particular areas, while there are almost no studies conducted with Saudi Arabian adult gamers among whom PUBG is very popular. The field has failed to attract the attention of the academic community. There hardly exists any academic research on the topic, and there is a general lack of research interest on the subject. Thus, there exists a lacuna in research on the impact of esports and video games, particularly PUBG, on the development of problem-solving and decision-making skills among adult learners in Saudi Arabia.

1.3 Literature Review

As discussed above, researchers have experimented with several transferrable skills, cognitive as well as non-cognitive, involved in playing esports and reported success in utilising the same skills of gamers in real-life problem-solving and decision-making capabilities or learning other life skills, including learning a foreign language. Grit and determination are such skills.

1.3.1 Soft Skills: Grit and Determination

Grit and determination are essential characteristics for success in any activity, whether it is to learn a skill or to perform any physical activity. In a study conducted by Aparicio et al. (2017), in the case of non-cognitive students (students who are not so intelligent in a traditional sense of term, but who possess skills that are not included in the definition of intelligence, such as resilience, consistency,

self-control, and persistence), the success of information systems is determined by the characteristics of non-cognitive students. Since consistency, grit, determination, and persistence function as determinants in e-learning, non-cognitive students possess better chances of success there. The researchers used the research construct "grit" as a concept introduced by Duckworth et al. (2007), who defined grit as entailing "working strenuously toward challenges, maintaining effort and interest over years despite failure, adversity, and plateaus in progress" (Duckworth et al., 2007, p. 1087). In a similar way, Hwang et al. (2024) investigated the role of learners' grit and determination in learning speaking skill in English as a foreign language using mobile app and came up with the findings that the use of app enhanced learners' enjoyment in learning English speaking skill and the app also improved learners' language-specific grit. As the researchers conducted a survey with the learners, they found that learners had a positive perception towards the mobile app in helping them learn English speaking skill in a fun way.

1.3.2 Problem-Solving and Decision-Making

What is problem-solving and decision-making? What is involved in problem-solving and decision-making? The primary skill required in problem-solving is logical reasoning, while what is involved in decision-making is risk-taking behaviour under circumstances of both certainty and uncertainty. Game features such as challenge-skill balance, rewards and subject agency help players sustain engagement and interest crucial in problem-solving. Agency, according to the game design literature, refers to the degree of freedom and control afforded to a player to perform actionable behaviours (for a review, see Carstensdottir et al., 2021; Nguyen et al., 2018). In a video game, players have the freedom to explore and interact with game elements based on their own goals, while selecting and organising appropriate resources to help them solve problem scenarios. Thus, agency helps learners engage in decision-making.

The common real-life problems vary in nature. For instance, the problems may be academic, such as falling grades, inability to make progress in a particular subject of study, cheating in exams, classroom anxiety, bullying, and lack of motivation, etc. It may be professional, such as tension and stress at work, extreme competitiveness, being late to work every day, workplace conflict, sexism at workplace, project failure, and so on. There are household problems, like divorce, parental feud, sibling rivalry, and so on. There are problems in relationship, such as adjustment issues, jealousy, or the problem may be financial, such as unemployment, expenditure more than income, or it may be social/political, such as racism, or even psychological, such as addiction (to drugs, mobile phone), drugs, illness, having trouble speaking a foreign language like English, having trouble expressing oneself articulately, etc.

Problem-solving usually involves two phases. In phase 1, the subject tries to understand the nature of the problem and thinks of the strategy to reach from point A to point B. Whereas in Phase 2, the subject applies the understanding and the perceived strategy to the real problem. To find a solution, the subject gathers information about the problem, then conceptualises the problem in words

(uttered mentally or written down), then thinks of a solution. Studies on the impact of esports and games on gamers' behaviour report that gamers learn information gathering and conceptualisation of the problem in words from esports and games. Context simulation is beneficial for cultivating gamers' abilities to establish and analyse questions and then select and develop solutions. They start looking for the causes and try to fix them. Fixing the final solution involves decision-making. Decision-making also involves two phases: Phase 1 encompasses grasping the issue at hand and trying to understand the pros and cons of a decision made with reference to a particular situation. Phase 2 involves making the final decision and watching the consequences, if the feedback is available instantly.

1.3.3 Gamification and Leaning

Gamification of learning elements, that is, incorporation of the elements of games and sports, especially of the digital games, like scoring points to win and gaining rewards against a contender, into educational programmes transforms the traditional (commonly tedious) lessons into engaging, entertaining, and enhanced learning experience, and boosts learning, and therefore, possesses high academic value. Research in this area shows encouraging outcomes in the field of foreign language learning too where different language elements can be taught in a fun way through gamification.

The review study by Chan and Lo (2024) reports that esports, video games, and gamification as a concept are gaining popularity as academic aids and researchers reviewed in the study agree that gamification of learning activities leads to enhancement in learning, such as language learning, therefore, educational institutions have started incorporating gamification as a teaching approach in their academic framework.

Another example is the study by Zhang and Hasim (2023) which reports that gamification is gaining popularity in non-English speaking countries to facilitate and enhance teaching of English as a foreign language to young learners who play video games on a regular basis. De Freitas (2018) in a review study of educational games, for example, highlights the significance of gaming in enhancing learner experience, and specifically, the therapeutic value of games. The studies the researcher has reviewed place high importance on the inputs from educationists, game science theorists, neuroscientists as well as inputs from information technologists.

The research by de Freitas (2018) is significant as it highlights the academic value of educational digital games and esports. Equally significant is the review study by Bernhaupt (2010). The researcher brings into focus the assessment methods and the adaptability of those methods to digital games involving man-machine interaction based on AI and used for academic purposes.

The researcher is particularly interested in the concepts related to gaming and learning, such as learner immersion, flow of information, and playability, that support learning. Ahmed et al. (2022) observe that conventional methods of

teaching English language components, such as idioms and phrases, produces slower results. However, if the same linguistic components are gamified, students are positively motivated to learn the elements faster. Barcomb and Cardoso's (2020) focus in their experiment with gamification was on teaching correct pronunciation to English language learners. The researchers concentrated on learners' acquisition of the English segments /r/ and /l/ in production (as in /r/each and /l/each, respectively). Their two-week experimental study involved research participants being engaged in gamified pronunciation activities using the learning site Moodle, focused on minimal pairs in English. The researchers reported favourable results from the experiment.

Similarly, Hung and Young (2015) used handheld devices (e.g. mobile phones and gaming devices) to load a board game to enhance English vocabulary teaching. The board game was designed to be interactive in nature. Their findings indicate that the use of handheld devices with preloaded games enhanced learner groups' dependence on each other, which helped better interaction among learners and improved their immersion in the vocabulary learning programme. The study by Chapman and Rich (2018) is also focused on the potential academic benefits of gamification of learning courses. Their findings suggest that gamification enhanced learner motivation irrespective of demographic variables among learners, such as gender, age, or status of learners.

1.3.4 Esports and Video Games

Wagner (2007) defines esports as "an area of sport activities in which people develop and train mental or physical abilities in the use of information and communication technologies" (p. 183). There is ongoing research on the academic value of esports and video games, particularly teaching and learning of a foreign language like English to young learners who are fond of playing video games, and researchers often report great success brought about by the use of esports and video games as learning enhancement techniques.

Although it is also true that psychologists largely denounce esports and video games as having negative impact on players, such as affirming belief in violence, additive influence of games, and generating depressive tendencies among youth, as reported by Granic et al. (2014) in their research study. Yet Granic et al. (2014) highlight the research studies focused on the positive effects of playing video games. Those studies were more concerned about the cognitive, motivational, emotional, and social aspects of the game since players derived all kinds of benefits from playing video games.

It is also noted that English as a foreign language learners benefitted from playing video games (that are always in English, without the benefit of subtitles) even when they did not intend to play the games to learn English. For instance, Bennacer (2022) reports the same phenomenon. The researcher noted that EFL learners' intention in playing video games was not to learn English consciously, nevertheless, their online activity helped them unconsciously pick up linguistic elements, such as vocabulary items, sentence structure and pronunciation.

The research study by Egenfeldt-Nielsen (2006) is an overview of research studies on the academic use of video games in light of the theories of learning, such as cognitivism, behaviourism, and so on, and provides valuable information on different researchers' viewpoints on how video games fair as learning aids evaluated from the perspectives of learning theories. The researcher also examines the conflicts, emerging with the advent of edutainment, between the binaries of teaching/learning scenarios, such as learning and play, freedom and control, etc. Fabricatore (2018) is interested in the mechanics of the game space affecting the psychological states of the players which keep them motivated and engaged in the game to the finishing line. It is possible that the mechanics of the game space can be simulated in classroom environment too, or rather, the game space can be turned into a virtual classroom.

A few researchers working in the selected academic field have conducted surveys to explore the potentials of esports and video games as learning aids in language classroom. For instance, Darvenkumar and Rajasekaran (2023) conducted one such survey and found that online gaming is a powerful tool for young learners to learn English and enhance their verbal communication in the language. Hobbs et al. (2006) use the constructivist pedagogical approach to examine the computer-mediated learning model supported by esports and video games as the researchers believe that the needs of both the gaming industry, which is out there for entertainment and commercial benefits, and the academic set ups that look for skill transfer from games to learning, can be met if games and virtual world created by games are employed in learning appropriately. The researchers propose a model involving students' group work which can overcome the video games affordance issue and enhance students' learning outcomes.

Zhong et al. (2022) have also conducted a review study of research focused on esports and video games. The research papers reviewed by them observe that the modern digitised world needs such skills in youth that are tuned to the recent technological innovations, and which cannot be developed in a traditional classroom setting. At this juncture esports and video games are very helpful since these virtual games are technology-based and require digital skills in the players. A few researchers have turned their attention to experimenting with esports and video games to teach English language elements to EFL learners.

For instance, Calvo-Ferrer and Belda-Medina (2021) used the video game Among Us to teach English language vocabulary to secondary school pre-intermediate EFL students. The researcher reported success in their experiment. They say that their students not only learnt some target words willingly, but other players were also exposed to the selected words and phrases in appropriate contexts through the students who learnt these words. The study by Xu et al. (2020) also used video games to teach vocabulary to EFL learners. The researchers chose to teach vocabulary since, to them, vocabulary is the most important language skill. The researchers found that good video games do enhance student's vocabulary learning.

Similarly, Toufik and Hanane's (2021) research probes the impact of online video games on gamers' communicative competence as well as intercultural understanding. They employed survey and interview method to collect data and found that online gaming is a good tool to improve learners' linguistic communication and understanding of cultures other than their own. Hubbard's (1991) research on the potential power of video games as language learning tools, tries to answer the important questions arising before language teachers as well as gaming software developers. The first question is regarding the parameters to determine a game-oriented language learning programme as game for learners. How can we make sure that language students will accept the programme as a game? The second question concerns the issue whether such a programme will really help students learn the language. The research by Gee (2003) tries to settle such doubts as the researcher claims that well designed esports and video games are learning mechanisms. In the opinion of the researcher, the game developers have largely solved the conundrum faced by teachers, that is, they have found the way to motivate young learners to learn and master the tedious and time-consuming skills in a fun way.

Zhong et al. (2024) also used questionnaire survey and interview technique to collect data for their research on the potential power of esports and video games to induce various skills, such as critical thinking and creativity in young learners. The researchers showed enthusiasm as their study displayed positive results, and therefore, they suggest that the elements of esports and video games should be integrated with new teaching approaches in the academia. A few other researchers, such as Han et al. (2024), Chan and Lo (2024), Salih and Omar (2024), Ahmed et al. (2022), Lie et al. (2022), Baltezarević and Baltezarević (2019), Gyaurov et al. (2022), Xu et al. (2022), and Vnucko et al. (2024) have also worked on the confluence and integration of esports and video games into educational curriculum to improve learners' various skills and reported favourable impacts of gaming on learning skill.

For instance, Han et al. (2024) explored whether EFL learners are, first of all, willing to strike a conversation with others and engage in communication, and if they are not, whether digital tools can help them gain confidence to strike a conversation in English with strangers. The research study by Lie et al. (2022) suggests that esports and video games can be considered as learning tools to help enhance learners' particular skills only if their designs suit learner requirements. The researchers conducted an experimental study keeping this proviso in mind and found that esports and video games do improve certain soft skill, such as problem-solving and decision-making. The design of a few games requires collaboration between players, and that helps enhance their oral expression skills.

Similarly, Baltezarević and Baltezarević's (2019) research study, a survey of participants' beliefs about the efficacy of video games in learning several skills, highlights that the competitive spirit among gamers leaves a favourable impact upon them and helps them gain several life skills, which are beyond the purview of traditional academic curricula, such as competitiveness, empathy, game spirit, and socialisation. On a similar note, studies by Cai et al. (2025), Gyaurov et al.

(2022), and Pasayat et al. (2025) find that learning through games and esports is an effective method to gain mastery over life skills, and it prepares gamers to face the challenges in real-life situations. Such skills, in the opinion of Gyaurov et al., (2022) are difficult to be developed in a conventional academic environment where the competition is only for marks and grades. Xu et al. (2022) identify a lack of research in the area of students' utilisation of skills gained from esports and video games. The researchers pinpoint the fact that learners' individual characteristics are linked to their striving-for-success behaviour and problem-solving aptitude. Therefore, the researchers conclude, more research is needed in this significant academic field. The findings from the study by Vnucko et al. (2024) also indicate an obvious link between the individual characteristics of gamers and gamification, and language learning skills. The researchers note that gamers fare better in learning English vocabulary compared to non-gamers.

However, some researchers warn that the success of esports and video games as learning aids may not be entirely because of their design and technology. For instance, Eseryel et al. (2014) observe that it is learners' motivation that determines their game engagement behaviour, which is largely responsible for their success at developing the required soft skills. Although the design of the game task also affects learner performance, whether in the game or learning a particular skill.

The literature review above is not exhaustive, yet it is clear that the potential uses of esports and video games in enhancing purely academic skills, such as language learning, linguistic communication, learner motivation, and critical thinking have attracted more attention of researchers globally than the development of soft skills, such as problem-solving and decision-making. In Saudi Arabia, research on the academic use of esports and video games is yet to take shape; the field is still in its nascent state and needs more research. Research on the use of esports and video games to develop problem-solving and decision-making skills among adult learners is still far from satisfactory.

1.4 Objectives of the Present Study

The primary aim of the current study was to investigate whether playing esports and video games enhances problem-solving and decision-making skills of university students. In other words, it was to determine whether problem-solving and decision-making skills involved in playing esports and video games are transferrable and applicable to real-life situations. The secondary aim of the study was to determine whether playing esports and video games help university students develop certain skills that have an academic value. The objectives of the study would be achieved by collecting and analysing university students' perceptions on the potential effects of playing esports and video games on the development of their problem-solving and decision-making skills.

1.5 Research Questions

The identification of the research problem stated above, and a thorough review of related literature, led the researcher to hypothesise that video games are helpful tools to develop problem-solving and decision-making skills among adult learners. The hypothesis was tested by designing a qualitative study at Hail University seeking answers to the following questions:

RQ 1: Does playing esports and video games develop problem-solving and decision-making skills among university students?

RQ 2: What is university students' common perception on the role of esports and video games in developing their problem-solving and decision-making skills?

1.6 Conceptual Framework

The design of the present research was informed by certain learning principles which provided the conceptual framework for the study. The first principle is that accepting challenges in fun environment leads to optimal engagement. The second idea is that ongoing feedback provides the required scaffolding, while the third principle is that specific interest in learners encourages optimal mental engagement, which in turn helps them develop some skill, such as manual dexterity or soft skills (Blumenfeld et al., 2005). Video games and esports have built-in motivational features sustaining players' interest and inculcate optimal engagement habits. Some of these features are a set goal, challenge-skill balance, on-the-spot rewards, and subject agency (Carstensdottir et al., 2021).

Thus, in a video game, players are free to choose, explore possibilities, and interact with game elements based on their own goals (Chapman & Rich, 2018). Keeping the conceptual framework in view, the research was designed to identify the key concepts in the data, such as understanding gamers' behaviour in developing the desired skills and understanding gamer's capabilities to transfer the acquired skills through play to real-life situations. It was surmised that it will help understand the relationship between the ideas/concepts and the chosen variables, i.e. the skills.

2. Methodology

The current study has employed the mixed-methods research methodology. Both quantitative and qualitative methods have been used for data collection and analysis. Quantitative method has been used to collect numerical data through survey questionnaire, whereas qualitative method was employed to make meaning of the numerical figures obtained after data analysis and present the results in a narrative format. However, there has been a heavy reliance on qualitative approach since the study involved establishing associations between certain concepts and some skills that are measurable but non-quantifiable. Quantitative and qualitative methodologies have been mixed at some interpretive points in the study.

2.1 Participants

60 female students from different classes were recruited to participate in the current study. Paper advertisements for participant recruitment were placed on notice boards in the female sections of Hail University campus. The criteria for participant selection were as follows: (i) Students must have played more than 100 esports and video games. This criterion was used, following Kokkinakis et al. (2017) and Valls-Serrano et al. (2022) to measure the effect of long exposure to esports on the identified skills; (ii) Only female students were to be recruited.

This was to make sure there was no confusion over gender difference in skills development; and (iii) Students must have played (preferably) PUBG. This criterion was set to measure the effect of a particular type of game on skills development (Dale & Green, 2017). It was also notified in the same ad that students who (i) suffer from any known nervous disorder that affected their general cognitive function, and (ii) consume drugs that affected normal brain function, were excluded from participation in the study. Table 1, given below, present the demographics statistics of the participants.

Table 1: **Participants' demographic data**

Data Collection Instrument	Participants	Number	Average Age	Average Number of games Played	Favourite Game	Time Spent Playing Game (hours per day)
Questionnaire	Female	60	22	240	PUBG	2-3
Interview	Female	10	22	240	PUBG	3-4

2.2 Research Instruments

Research data were collected using the following tools:
(i) a survey questionnaire, and
(ii) structured interviews with selected participants

The survey questionnaire was comprised of a 5-point Likert scale. The scale contained 14 prompt statements followed by a series of five answer statements - Strongly disagree, Disagree, Neutral, Agree, and Strongly agree. The prompt statements were meant to elicit participants' responses on the impact of playing video games they perceived on the development of their soft skills, problem-solving and decision-making. The structured interview format contained 15 questions meant to prompt participants to elaborate upon why they perceived that video games helped them develop problem-solving and decision-making skills.

The open-ended nature of semi-structured interviews allows flexibility of response to participants (Miles & Huberman, 1994) and the method also allows the researcher to delve deep into the perspectives of participants concerning the impact of independent variable on dependent variable, i.e. in the present study, the impact of video games on development of soft skills. The validity and internal consistency of the survey questionnaire was checked using Cronbach's Alpha calculations, whereas the reliability and validity aspects of the interview format were tested through piloting the interview and seeking suggestions for improvement from experienced colleagues. Their suggestions were incorporated into the final interview format.

2.3 Research Design

The present study is a perception-based qualitative study, though numbers also have played an important role in arriving at the results. Data on adult gamers' (university students) perception of the impact of video games on the development of their soft skills, i.e. problem-solving and decision-making, were collected through a survey questionnaire. Structured interview sessions were conducted with a smaller number of participants who endorsed a favourable impact of video games on soft skills. The focus of interview questions was on (i) gaming experience, (ii) gaming frequency, (iii) time spent on each gameplay, and (iv) how they correlated their gaming experience with enhancement in their soft skills.

The first research question is answered by analysing the number of participants responding to the questionnaire variables. A comparatively higher number of participants choosing a particular variable is taken to mean participant's endorsement of the idea the variable stands for. The second research question is answered by analysing participants' perception of the impact of video games on the desired soft skills. This is achieved by analysing participants' responses to questionnaire statements, corroborated by their reflections on the same issues in interview sessions. Findings from previous research on the topic are also taken into account to corroborate the findings from the current research.

2.4 Procedure

Data from participants were collected between September 2023 and June 2024. Participants were briefed about the purpose of the study. They also signed a consent form. The interview sessions lasted about 30 minutes, while the survey questionnaire was left overnight with the participants and collected the next day.

First, the survey questionnaire was distributed to 100 participants. They were instructed to return the filled-in questionnaire the next day. A total of 80 participants returned the questionnaires. After checking for responses, only 60 questionnaires were found suitable to be included in the study. The rejected questionnaires were either incomplete or indicated multiple choices. The questionnaires were further scrutinised for responses, and from this pool of respondents 10 participants were selected to participate in the semi-structured interviews in accordance with the relevance of their responses to the research topic.

Only those participants were selected for interview who had expressed strong agreement to the research statement that playing video games had helped them develop problem-solving and decision-making skills since the purpose of the interview was to elicit elaboration from participants as to why they perceived it was playing the games that contributed to their skills development. The interviews were video recorded using a tablet device. The interview responses were analysed for thematic categorisation.

3. Data Collection and Analysis

Statistical analysis was used to calculate the results from the raw figures obtained from the questionnaires, while deductive and thematic analysis approaches were used to analyse the data obtained from interviews. Evidence of specific concepts

relevant to the conceptual framework were identified in the interview data. Patterns in the meanings emerging from this qualitative data analysis were identified, analysed and interpreted using a flexible thematic approach (Clarke et al., 2015) as the approach suits the aims of the present study being a versatile yet stand-alone method of qualitative analysis (Clarke et al., 2015). To ensure the accuracy of participants' perspectives in the analysis, they were supplied with a copy of the interpretation for a review and to provide feedback. Numerical data were subjected to statistical analysis, calculation of means and significance of values using tables, figures and graphs.

3.1 Data Analysis

Validity and reliability of the questionnaire were checked through a mock test conducted with the participants, followed by calculating Cronbach's Alpha (see Appendix A for calculations). The obtained value of Alpha was 0.88, a good indicator of validity, reliability and internal consistency of questionnaire statements. Robustness of the questionnaire's internal consistency was also established through correlational tests and confirmatory factor analysis. Multiple regression model also indicated strong, favourable relationships between the variables. Therefore, no changes were made in the questionnaire for final data collection.

The raw scores obtained from the questionnaire were tabulated and used for further calculations, such as number and percentage of participants in agreement or disagreement with the questionnaire statements. The interview responses received from participants were organised into the following thematic categories: (i) Problem-solving, (ii) Decision-making, (iii) More video games, more gains.

4. Results

The results obtained from data analysis are presented in the forthcoming sub-sections.

4.1 Results Obtained from the Questionnaires

The raw data obtained from the questionnaires were subjected to statistical analysis (See Appendix A to view the statistical analysis of raw scores obtained from the questionnaires used to calculate Cronbach's Alpha, percentage of respondents for all five variables - Strongly agree / Agree / Neutral / Disagree / Strongly disagree - and the statement-wise percentage for the variables). Table 2, given below, presents the number of participants (percentage figures) choosing the stated study variables.

Table 2: Number of participants choosing the stated study variables

No.	Statement	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
1	I am very fond of playing video games / esports.	0	9	0	21	30
2	The video games/esports I play involve scenarios where I have to find solutions to problems built in	6	3	3	24	24

No.	Statement	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
	the game, using the given resources and strategies.					
3	I always find solutions to problems built in video games/esports and try to win in the end.	0	9	12	21	18
4	The skill to find solutions to video game/esport problems helps me find solutions to real-life problems as well.	3	3	15	15	24
5	Playing esports/video games has helped me develop the skills to solve real-life problems.	3	3	12	24	18
6	I did not have the skills to solve real-life problems before I started playing video games.	24	30	6	0	0
7	The video games/esports I play involve scenarios where I have to make decisions in difficult situations with a limited set of choices.	0	6	15	15	24
8	I make the decision in the game only when I am sure I am making the right decision.	6	0	3	30	21
9	I make the decision in the games even if I am not sure I am making the right decision.	3	3	6	27	21
10	I succeed in making the right decisions in the video games/esports after trials and retrials since I am determined to win in the end.	3	6	3	24	24
11	The skill to make decisions in all kinds of situations (sure and unsure) in video games/esports helps me make decisions in real-life situations as well.	3	6	9	27	15
12	Playing esports/video games has helped me develop the skill to make decisions in real-life scenarios.	3	6	6	24	21
13	I did not have the skills to make decisions before I started playing video games.	24	30	6	0	0
14	Problem-solving and decision-making skills I use in games/esports get enhanced as I spend more time playing video games/esports.	6	3	3	33	15

For a quick grasp of the results obtained, in Table 3, given below, are presented the final percentage figures obtained after analysis of participants' agreement or disagreement with the questionnaire statements. The number of respondents who chose "Neutral" was not taken into consideration for the results. The reason for this was that the choice neither referred to "agreement" nor to "disagreement" to the questionnaire statements.

Table 3. Percentage of Respondents in Agreement or Disagreement with the Questionnaire Statements

No	Statement	Agreement (Strongly agree + Agree) %	Neutral %	Disagreement (Disagree + Strongly disagree %
1	I am very fond of playing video games / esports.	50+35 = 85	0	0+15 = 15
2	The video games/esports I play involve scenarios where I have to find solutions to problems built in the game, using the given resources and strategies.	40+40 = 80	5	5+10 = 15
3	I always find solutions to problems built in video games/esports and try to win in the end.	30+35 = 65	20	0+15 = 15
4	The skill to find solutions to video game/esport problems helps me find solutions to real-life problems as well.	40+25 = 65	25	5+5 = 10
5	Playing esports/video games has helped me develop the skills to solve real-life problems.	30+40 = 70	20	5+5 = 10
6	I did not have the skills to solve real-life problems before I started playing video games.	0	10	50+40 = 90
7	The video games/esports I play involve scenarios where I have to make decisions in difficult situations with a limited set of choices.	40+25 = 65	25	0+10 = 10
8	I make the decision in the game only when I am sure I am making the right decision.	35+50 = 85	5	10+0 = 10
9	I make the decision in the games even if I am not sure I am making the right decision.	35+45 = 80	10	5+5 = 10
10	I succeed in making the right decisions in the video games/esports after trials and retrials since I am determined to win in the end.	40+40 = 80	5	10+5 = 15
11	The skill to make decisions in all kinds of situations (sure and unsure) in video games/esports helps me make decisions in real-life situations as well.	25+45 = 70	15	10+5 = 15
12	Playing esports/video games has helped me develop the skill to make decisions in real-life scenarios.	35+40 = 75	10	10+5 = 15
13	I did not have the skills to make decisions before I started playing video games.	0	10	50+40 = 90
14	Problem-solving and decision-making skills I use in games/esports get enhanced as I spend more time playing video games/esports.	25+55 = 80	5	5+10 = 15

No	Statement	Agreement (Strongly agree + Agree) %	Neutral %	Disagreement (Disagree + Strongly disagree %
	Statistical values	Mean: 75 SD: 7.6 Var: 54.16	Mean: 12.6 SD: 7.5 Var: 52.36	Mean: 23.92 SD: 28.09 Var: 732.7

A cursory glance at Table 3, above, shows that the variable "Strongly agree" has attracted the largest number of respondents, closely followed by the variable "Agree." Consequently, in Table 3, above, the percentage of respondents in agreement with the stated hypothesis is higher than the percentage of respondents in disagreement. The information can be represented graphically as follows:

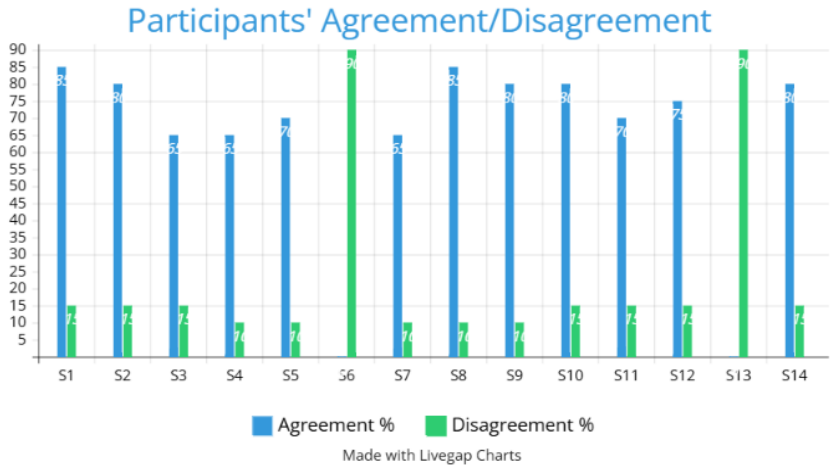

Figure 1: Graphic representation of the percentage of participants agreeing/disagreeing with the questionnaire statements (S = statement)

4.2 Results Obtained from the Interview Sessions

In the structured interview sessions, participating students endorsed their opinions on the positive impact of video games on the development of their problem-solving and decision-making skills they had expressed in the survey questionnaire. Students strongly favour video games for other soft skills as well. A thematic analysis of their interview responses is discussed below:

4.2.1 Problem-solving

Logical thinking and problem-solving lie at the heart of most action-packed video games, such as PUBG. The player needs to think deeply about breaking up the emerging problems into smaller components and solve them systematically. One of the interviewees, for example, stated that,

> *The game forces me to dissect complex problems built in the game into smaller problem-components that are manageable, and then I tackle them one by one. Now, after I started playing video games, I apply the same strategy to solve my problems in the real-life as well. What I mean is I*

> *don't see it as one problem, but a complex issue made up of several smaller issues.*

In technical terms, this process is called computational thinking. If learners follow through the process, their ability to solve academic problems even across disciplines is enhanced. The other important trait gamers need to have to win is perseverance and attention to detail. One of the participants expressed the feeling as follows:

> *My attitude to life has been casual and I used to take everything in daily life casually. But as I started playing video games, I had to change my attitude, and I learnt perseverance as well as to pay close attention to the details in the games to be the winner. I pay attention to details in all sorts of problems now and work hard to solve them.*

4.2.2 Decision-Making

Decision-making requires logical sequencing of the facts affecting the making of a decision. Video games players have to essentially make decisions at many points in the games; therefore, they are required to create a sequence of facts in logical order to achieve specific outcomes in the game. For instance, one participant put it this way:

> *As I play the game, I encounter situations where I have to decide my next move, and it has to be the winning move. So, I arrange the facts affecting my decision in a sequence, that is, what comes first and what should be the last action. This strategy generally works for me, and I win.*

Games provide the players with a simulated situation to act, such as to solve a problem or make a decision. The fact is that simulation can help gamers understand the nature of a similar problem in real-life situations. Participants agreed on this point, and one of them said that,

> *I see the problems and issues in daily activities the same way as I see them in video games, and it helps me understand the nature of hurdles and roadblocks I encounter.*

Participants said that it would not be true to say that they did not have problem-solving and decision-making skills before they started playing video games, but yes, their deep engagement in video games prompted them to put the skills to use, first in simulated environments and then in real-life situations. One participant stated that,

> *I had the skills to solve problems and make necessary decisions prior to playing video games, but I think, most probably I never felt the need to use them or ignored the situations involving problem-solving or decision-making in daily living. However, as I started playing video games, I began closely watching the situations and getting myself involved in taking actions. Now I am not afraid of making any decisions.*

4.2.3 Time and Skills Development

Almost all the interviewees agreed on the point that the more time they spend playing video games, the better it is to hone the skills to perfection. One of the interviewees said that,

> *Initially, I was not as sharp as I am now in solving the problems in my daily life. I believe it is the time I spent playing video games that helps me in thinking critically and consider all the available evidence to solve a problem and arrive at a decision.*

5. Discussion: Research Findings

The summary of results obtained from data analysis, presented in Table 3, above, provides a clear picture of participants' perception of video games as tools to help them develop soft skills, such as problem-solving and decision-making. 65% participants say that the skill to find solutions to problems in video games helps them find solutions to real-life problems as well, while 70% participants say that playing video games has helped them develop the skills to solve real-life problems. Although a majority of participants (90%) disagree that they did not have the skills to solve real-life problems before they started playing video games.

The indication is that they did have the skill, but not fully realised in real-life situations, while playing video games has helped them hone the skill in a virtual environment and provided them the confidence to apply it to realistic problems in their lives. On a similar note, 75% participants agree that playing video games has helped them develop the skill to make decisions in real-life scenarios. 85% of the participants say that they make the decision in the game only when they are sure they are making the right decision, while 80% of them say that they make the decision in the games even if they are not sure they are making the right decision.

This indicates their risk-taking behaviour which may be translated into taking risky decisions in real-life conditions. Once again, a large number of participants (90%) disagree with the proposition that they did not have decision-making skills before they started playing video games, which means they did have the skill but did not use it in realistic situations. Playing video games has helped them overcome the fear of taking risks by making decisions.

Moreover, 80% of the participants say that they succeed in making the right decisions in the video games after trials and retrials since they are determined to win in the end. Making attempts to succeed in virtual environments helps them overcome the fear of failure, which is also transferrable in the actual decision-making situations. As regards time, 80% participants say that problem-solving and decision-making skills they use in video games get enhanced as they spend more time playing video games.

The number of participants in disagreement with the questionnaire statements is very low. Only 10% participants disagree with the proposition that the skill to find solutions to problems in video games helps them find solutions to real-life problems as well. Similarly, only 15% participants disagree with the statement that the skill to make decisions in all kinds of situations (sure and unsure) in video

games helps them make decisions in real-life situations. And as regards the positive impact of longer time spent on playing video games, only 15% participants disagree with the idea that the problem-solving and decision-making skills they use in games get enhanced as they spend more time playing video games.

The findings from the current study are comparable to findings reported in a few previous studies. For instance, Valls-Serrano et al. (2022) report that they found a positive relationship between gamers' decision-making skill and some in-game performance variables, and the researchers also emphasise that there exists a possibility of predicting learner performance on specific variables. Eseryel et al. (2014) report in their findings that gamers' optimal engagement is crucial in learning specific skills, such as problem-solving, while their engagement is determined by their motivation to play the games. The review study by Gyaurov et al. (2022) also finds that most studies reviewed here show that the digital games that mimic real-world scenarios are found helpful for gamers to learn complex problem-solving and decision-making skills. Findings of research studies by Lie et al. (2022), Xu et al. (2022), Zhong et al. (2022) and Zhong et al. (2024) also corroborate the findings from the present study.

6. Conclusion

The present research study was designed to answer two research questions: (1) Does playing esports and video games develop problem-solving and decision-making skills among university students? (2) What is university students' common perception on the role of esports and video games in developing their problem-solving and decision-making skills? Data were collected keeping in view the prevalence of a particular video game, PUBG, popular among Saudi young generation, and a few differences perceived between gamers and non-gamers in problem-solving and decision-making skills.

The results obtained from data analysis indicate that the answer to research question 1 is in the affirmative, that is, playing video games has the potential to develop problem-solving and decision-making skills among university students. Responses of research participants to survey questionnaire statements and endorsement of their opinions during structured interview sessions have confirmed this observation. Answer to research question 2 is not so straightforward, though. Although a majority of participants perceive video games as very helpful in developing soft skills, such as problem-solving and decision-making, yet a smaller number of participants have expressed their disagreement with this proposition, however small their number may be.

Moreover, participants disagree that they did not have problem-solving and decision-making skills prior to their engagement in video games. The indication is that playing video games enhances the skills the gamers already have by providing them an opportunity to engage in problem-solving and decision-making exercise in a simulated environment; merely playing video games cannot develop any skills. Also, not all gamers may be able to translate the skills enhanced through playing video games into real-life actionable situations.

To summarise, the significance and implications of the research findings are that videogames are no more confined to obscure settings frequented by youngsters without the knowledge of their wards. Now the games are widely accepted in the academia as learning tools that possess the potential to enhance certain soft skills, such as problem-solving and decision-making, among adult players. However, gamers' deep engagement in the game plays a crucial role in skills development. The findings are also significant as the research adds to the existing as well growing body of knowledge on the effects of esports intervention on adult learning.

7. Limitations of the Study

Although enough care was taken to cover all the significant aspects of the topic under research, yet for lack of time and limited resources there were a few points the researcher has failed to cover. First, the present study was gender restricted, i.e. confined to only female participants. A comprehensive involvement of both male and female participants in the study would have produced a better picture. Second, only one video game, PUBG, was included in the study for investigation. A study examining the impact of diverse video games on soft skills will throw more light on the potential of video games in developing any skills. A yet another limitation of the study is that the findings from the study cannot be generalised since to arrive at generalisable findings needs a wider research context and experimentation with a larger subject population.

8. Further Recommendations

A close examination of the limitations of the present study prompts the researcher to suggest future researchers in the field to consider the following points:

- Both male and female students are made participants for a comprehensive study of the impact of video games on the development of soft skills among adult gamers.
- The investigation includes a diverse array of video games to understand whether different video games affect skills development in different degrees and manner.

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Appendix A
Survey Questionnaire

Please rate your agreement /disagreement with the statements given below regarding your experience of playing video games/esports. As your response, circle the number, as follows:

1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree

1. I am very fond of playing video games / esports.

Strongly Disagree	1	2	3	4	5	Strongly Agree

2. The video games/esports I play involve scenarios where I have to find solutions to problems built in the game, using the given resources and strategies.

Strongly Disagree	1	2	3	4	5	Strongly Agree

3. I always find solutions to problems built in video games/esports and try to win in the end.

Strongly Disagree	1	2	3	4	5	Strongly Agree

4. The skill to find solutions to video game/esport problems helps me find solutions to real-life problems as well.

Strongly Disagree	1	2	3	4	5	Strongly Agree

5. Playing esports/video games has helped me develop the skills to solve real-life problems.

Strongly Disagree	1	2	3	4	5	Strongly Agree

6. I did not have the skills to solve real-life problems before I started playing video games.

Strongly Disagree	1	2	3	4	5	Strongly Agree

7. The video games/esports I play involve scenarios where I have to make decisions in difficult situations with a limited set of choices.

Strongly Disagree	1	2	3	4	5	Strongly Agree

8. I make the decision in the game only when I am sure I am making the right decision.

Strongly Disagree	1	2	3	4	5	Strongly Agree

9. I make the decision in the games even if I am not sure I am making the right decision.

Strongly Disagree	1	2	3	4	5	Strongly Agree

10. I succeed in making the right decisions in the video games/esports after trials and retrials since I am determined to win in the end.

Strongly Disagree	1	2	3	4	5	Strongly Agree

11. The skill to make decisions in all kinds of situations (sure and unsure) in video games/esports helps me make decisions in real-life situations as well.

Strongly Disagree	1	2	3	4	5	Strongly Agree

12. Playing esports/video games has helped me develop the skill to make decisions in real-life scenarios.

Strongly Disagree	1	2	3	4	5	Strongly Agree

13. I did not have the skills to make decisions before I started playing video games.

Strongly Disagree	1	2	3	4	5	Strongly Agree

14. Problem-solving and decision-making skills I use in games/esports get enhanced as I spend more time playing video games/esports.

Strongly Disagree	1	2	3	4	5	Strongly Agree

Interview Questions

1. Please tell us about yourself.

2. What video games/esports do you play in your free time?
3. How long have you been playing video games?
4. How many hours per day do you play your favourite video game / esport?
5. Does the game/esport you play involve scenarios where you have to find solutions to problems built in the game, using the given resources and strategies?
6. Do you always succeed in finding solutions to game/esport problems and try to win in the end?
7. Do you think the skill to find solutions to game/esport problems helps you find solutions to real-life problems as well?
8. Do you think playing esports/games has helped you develop the skill to solve real-life problems? Please give some examples.
9. Does the game/esport you play involve scenarios where you have to make decisions in difficult situations with a limited set of choices?
10. Do you think you make the right decision in the game only when you are sure you are making the right decision?
11. Do you think you make the right decision in the game even if you are not sure you are making the right decision?
12. Do you succeed in making the right decisions in the game/esport after trials and retrials and try to win in the end?
13. Do you think the skill to make decisions in all kinds of situations (sure and unsure) in game/esport helps you make decisions in real-life situations as well?
14. Do you think playing sports/games has helped you develop the skill to make decisions in real-life scenarios? Please give some examples.
15. Do you think your problem-solving and decision-making skills used in games/esports get enhanced as you spend more time playing games/esports? Please elaborate with examples.

Table 1. Scoring: Mean, Standard Deviation, Variance, and Cronbach's Alpha for the Questionnaire

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Total
1																
2		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	
3	1	4	5	5	4	5	2	3	5	5	4	5	4	2	4	57
4	2	4	4	3	3	4	1	5	5	5	4	4	5	1	4	52
5	3	2	1	2	3	1	2	2	1	3	2	2	1	2	1	25
6	4	5	4	3	3	5	2	5	4	4	5	4	5	2	4	55
7	5	5	5	4	5	3	1	3	5	5	5	3	4	1	5	54
8	6	5	4	5	4	4	2	4	4	4	4	4	3	2	4	51
9	7	4	5	4	4	4	3	5	5	5	4	3	4	3	4	57
10	8	2	2	2	2	3	1	2	3	1	2	1	2	1	1	25
11	9	5	4	5	5	4	2	5	4	5	5	4	5	2	4	59
12	10	5	5	5	5	5	1	3	4	4	5	5	5	1	5	58
13	11	5	3	5	3	5	2	4	4	5	4	5	4	2	5	56
14	12	5	5	4	4	5	2	5	5	3	4	4	4	2	4	56
15	13	5	4	4	5	3	2	5	4	4	3	5	4	2	4	54

16	14	2	1	2	1	2	1	3	1	2	1	2	2	1	2	23
17	15	4	5	4	5	4	1	4	4	5	5	4	5	1	4	55
18	16	4	4	4	3	4	1	5	5	4	4	4	5	1	5	53
19	17	4	5	3	5	4	3	4	4	4	5	5	3	3	4	56
20	18	4	4	5	5	3	2	5	4	4	4	4	5	2	3	54
21	19	5	4	4	5	5	1	4	5	4	5	3	4	1	4	54
22	20	5	5	3	4	4	2	3	4	4	5	4	4	2	5	54
23	21	4	5	5	4	5	2	3	5	5	4	5	4	2	4	57
24	22	4	4	3	3	4	1	5	5	5	4	4	5	1	4	52
25	23	2	1	2	3	1	2	2	1	3	2	2	1	2	1	25
26	24	5	4	3	3	5	2	5	4	4	5	4	5	2	4	55
27	25	5	5	4	5	3	1	3	5	5	5	3	4	1	5	54
28	26	5	4	5	4	4	2	4	4	4	4	4	3	2	4	51
29	27	4	5	4	4	4	3	5	5	5	4	3	4	3	4	57
30	28	2	2	2	2	3	1	2	3	1	2	1	2	1	1	25
31	29	5	4	5	5	4	2	5	4	5	5	4	5	2	4	59
32	30	5	5	5	5	5	1	3	4	4	5	5	5	1	5	58
33	31	5	3	5	3	5	2	4	4	5	4	5	4	2	5	56
34	32	5	5	4	4	5	2	5	5	3	4	4	4	2	4	56
35	33	5	4	4	5	3	2	5	4	4	3	5	4	2	4	54
36	34	2	1	2	1	2	1	3	1	2	1	2	2	1	2	23
37	35	4	5	4	5	4	1	4	4	5	5	4	5	1	4	55
38	36	4	4	4	3	4	1	5	5	4	4	4	5	1	5	53
39	37	4	5	3	5	4	3	4	4	4	5	5	3	3	4	56
40	38	4	4	5	5	3	2	5	4	4	4	4	5	2	3	54
41	39	5	4	4	5	5	1	4	5	4	5	3	4	1	4	54
42	40	5	5	3	4	4	2	3	4	4	5	4	4	2	5	54
43	41	4	5	5	4	5	2	3	5	5	4	5	4	2	4	57
44	42	4	4	3	3	4	1	5	5	5	4	4	5	1	4	52
45	43	2	1	2	3	1	2	2	1	3	2	2	1	2	1	25
46	44	5	4	3	3	5	2	5	4	4	5	4	5	2	4	55
47	45	5	5	4	5	3	1	3	5	5	5	3	4	1	5	54
48	46	5	4	5	4	4	2	4	4	4	4	4	3	2	4	51
49	47	4	5	4	4	4	3	5	5	5	4	3	4	3	4	57
50	48	2	2	2	2	3	1	2	3	1	2	1	2	1	1	25
51	49	5	4	5	5	4	2	5	4	5	5	4	5	2	4	59
52	50	5	5	5	5	5	1	3	4	4	5	5	5	1	5	58
53	51	5	3	5	3	5	2	4	4	5	4	5	4	2	5	56
54	52	5	5	4	4	5	2	5	5	3	4	4	4	2	4	56
55	53	5	4	4	5	3	2	5	4	4	3	5	4	2	4	54
56	54	2	1	2	1	2	1	3	1	2	1	2	2	1	2	23
57	55	4	5	4	5	4	1	4	4	5	5	4	5	1	4	55

58	56	4	4	4	3	4	1	5	5	4	4	4	5	1	5	53
59	57	4	5	3	5	4	3	4	4	4	5	5	3	3	4	56
60	58	4	4	5	5	3	2	5	4	4	4	4	5	2	3	54
61	59	5	4	4	5	5	1	4	5	4	5	3	4	1	4	54
62	60	5	5	3	4	4	2	3	4	4	5	4	4	2	5	54
63																
64	Mean	4.2	3.95	3.8	3.9	3.8	1.7	3.95	4.0	4.0	4.0	3.75	3.9	1.7	3.8	50.4
65	SD	1.02	1.2	1.05	1.16	1.08	.65	1.16	1.37	1.07	1.14	1.08	1.16	.65	1.19	11.4
66	Var	1.06	1.5	1.06	1.29	1.12	.41	1.3	1.8	1.1	1.3	1.18	1.29	.41	1.36	123.4
67	K	60														
68	Σ Var	16.18														
69	Var.	123.4														
70	α	0.88														

$\alpha = (K/(K-1)) \times (1- \Sigma Var./Var.)$
$\alpha = (60/ (60-1)) \times (1-16.18/123.4)$
$\alpha = 0.88$

Table 2a: Questionnaire 1: Statement-wise Number / Percentage of Respondents for All Five Variables - Strongly Agree-Agree-Neutral-Disagree-Strongly disagree

Variables	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14
Strongly agree	30	24	18	24	18	0	24	21	21	24	15	21	0	15
%	50	40	30	40	30	0	40	35	35	40	25	35	0	25
Agree	21	24	21	15	24	0	15	30	27	24	27	24	0	33
%	35	40	35	25	40	0	25	50	45	40	45	40	0	55
Neutral	0	3	12	15	12	6	15	3	6	3	9	6	6	3
%	0	5	20	25	20	10	25	5	10	5	15	10	10	5
Disagree	9	3	9	3	3	30	6	0	3	6	6	6	30	3
%	15	5	15	5	5	50	10	0	5	10	10	10	50	5
Strongly disagree	0	6	0	3	3	24	0	6	3	3	3	3	24	6
%	0	10	0	5	5	40	0	10	5	5	5	5	40	10

For the sake of convenience and for ease of understanding, the scores from Table 2a are simplified and presented in Table 2b, as given below.

Table 2b: Statement-wise Percentage for All Five Variables - Strongly agree-Agree-Neutral-Disagree-Strongly disagree

Variables	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total

Statement	%	%	%	%	%	%
S1	50	35	0	15	0	100
S2	40	40	5	5	10	100
S3	30	35	20	15	0	100
S4	40	25	25	5	5	100
S5	30	40	20	5	5	100
S6	0	0	10	50	40	100
S7	40	25	25	10	0	100
S8	35	50	5	0	10	100
S9	35	45	10	5	5	100
S10	40	40	5	10	5	100
S11	25	45	15	10	5	100
S12	35	40	10	10	5	100
S13	0	0	10	50	40	100
S14	25	55	5	5	10	100