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Childcare services and AI technology: A study of parental perceptions in Hong Kong

Investigates the five dimensions of SERVQUAL instrumentation in assessing services quality and value affecting parent's satisfaction in a Childcare Centre using AI technology into operating in Hong Kong

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Prepared by Garry Yu

HKBM7004 – Quantitative Research Methods

Executive Summary

Background

With the continued rise in the application of big data, educators also see considerable development and progress with technology into childcare services development globally. In 2018, a report of International Data Corporation (IDC) Future Scape Research indicated that more than 60% of businesses are tended to more focus on scientific business models and integrating technology into daily operating platforms to ensure streamline work processing, increase productivity, enrich communication and competitiveness. In recent years, businesses engage with big data technology were more focused on cloud operating, mobile communication, and data mining to support information analysis and data acquisition (Huang 2018). Early in 2019, the first SAFR (Secure Accurate Facial Recognition) was launched to one of an American private elementary school in Seattle, Washington. Once every student, parents', teacher, and school staffs' faces were scanned and input into the database, the SAFR system is capable to manage all data and identify all attendance, and even can tell any twin students of those have great similarity. Sophisticated Artificial Intelligence technology is also exploited and integrated into the education industry, especially into the classroom. In the early stage, various teaching tools are multimedia-based which involved in study activities, learning data, synchronous communicating, and process monitoring. Recently, the US, Japan, India, and Mainland China have relied on facial recognition and AI-enabled attendance and monitoring system for daily operation. Many of those systems are capable of recording via mobile application and GPS to keep track and manage students' relevant details. During this century epidemic COVID-19 outbreak, organizations are demanding and implement re-opening for a safety and health management system such as a Non-contact Temperature Assessment device as part of an initial check at entry areas for identifying those who may have symptoms of high fever. Childcare centers are very cautious on any health relative concerns to prevent any cross-infection between children. An AI-technology enabled system can be adapted with student attendance system can be screening the temperature result before student went into school, system also train to verify symptoms of another popular childhood disease such as pink eyes, head lice and coughing. Organization is much motivated and determined in their health guard tool for daily operation.

Historically, educators and industry tended to enable digital technology for system upgrading, to provide better services, and uplift the quality of the entire learning environment (Gerdes 2018). Although AI Technology enabled system has massive functional implication, but under parenthood perspective, the important level to meet their expectation and other issues such as privacy and personal data handling might having great disadvantage for this Technology Acceptance Model in the context of service quality of AI-technology in different dimensions of childcare services. Most information systems contain a large scale of functional services components. In past, many studies and research have examined the SERVQUAL instrument for measuring service quality (Naik, Gantasala and Prabhakar 2010) and numerous industrial sampling and data able to serves to verify the instrument structure and to measure the correlation of user satisfaction to indicates the SERVQUAL metric of the views of service perception (Hussin, Mokhlis, & Salleh, 2019). Therefore, the SERVQUAL instrument will serve as a key measurement tool for AI-Technology enabled system and providing an accurate view for system developers attempting to improve service and provide information to teachers and school in evaluating services quality for future improvement.

This research is conducted in a group of parents and self-administer questionnaire for data collecting, all related data are based on the SERVQUAL model via invitation of 60 randomly selected participants. In-light of this pilot study will demonstrate the five dimensions of SERVQUAL model of the Tangibility, Reliability, Responsiveness, Assurance, and empathy of service quality which integrating of AI-Technology into childcare center day to day operating system with significant positive effects on services satisfaction level of parenthood perspectives.

Objectives

The primary objectives are to examine the dimensions of parental perceptions of child-care services by using SERVQUAL instrument about AI Technology integrate into the student's monitoring system at the childcare center. Knoche, Peterson, Edwards, and Jeon (2006) indicated that parents' satisfaction on childcare center is a state of mind when they receive an experience, performance and any outcome which are meet their expectation. Most parents are concerning different factors when they select childcare service such as pricing to meet their budget, location for own convenience, program characteristics for children

learning development, facility support, and quality for services assurance. However, many studies show ambiguous findings, some parents are tended to have a traditional setup and others are preferring global satisfaction as well as rapidly change their desire with other services providers. Lien (2008) indicated that such contradictory findings were demonstrated that parents are not necessary to understand and knowledgeable enough to evaluate childcare services, or parents' value different aspects without any structural or correlation among service quality, satisfaction, and parental perspective.

In the past decade, the trend of artificial intelligence technology implementation into childcare services was increasing globally. Lin, Shih, and Sher (2007) found that there are several reasons for adopting into the educational industry, may be able to provide and motives caregivers to learn and obtaining information, and encouraged to engage in self-development in creative activities. Despite the creation of technology implementation, many childcare centers and caregivers may not realize that technology in or itself may not be able to change or mortify the business practices. Nevertheless, integrating AI technology-enabled system into their classroom have been shown to influence the quality of the services which able to meet parents' expectations (Lin, Shih and Sher 2007). The key objectives of this study are to examine (1) to investigate mechanisms of AI technology implementation; (2) assess the extended AI technology within the Hong Kong market; (3) to identify the quality dimensions of the Technology Acceptance Model (TAC) approach; and (4) to determine the associations among assessments of quality, parenthood perspective of different aspects of parental satisfaction (Figure 1).

Besides, the researcher also to determine the correlations of potential parenthood and educator reaction to various perception of the childcare services, such as (A) Identify industry needs; (B) to develop a framework to utilize cross data for children conceptual development.

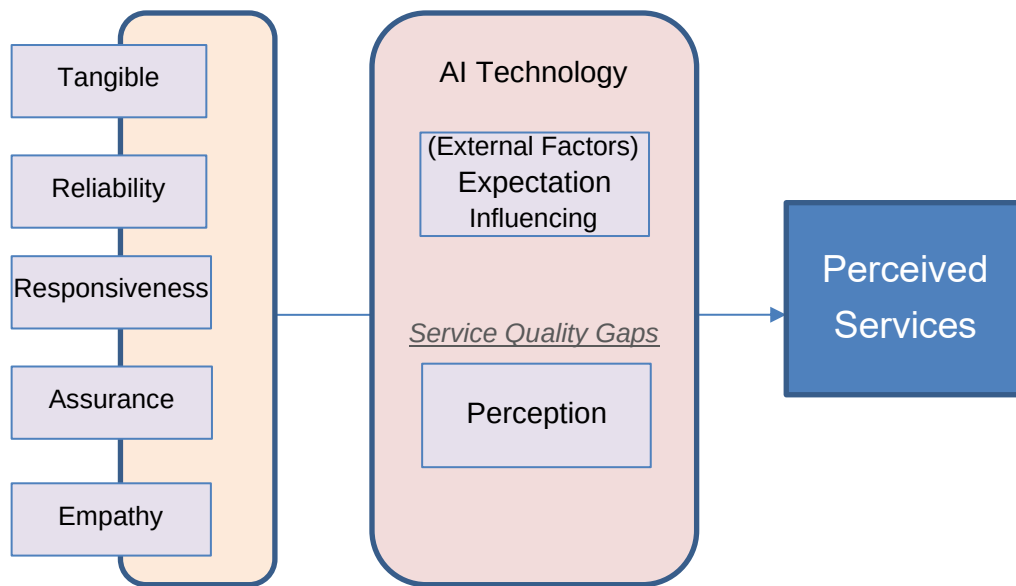


Figure 1: The Dimensions of Perceived Service Quality

Research Questions

Data sets generated by the questionnaires were used to examine parental perceptions of childcare centers with AI-Technology by SERVQUAL model. The research questions to be answered by this study are:

- Parents' satisfaction level of AI technology into childcare center for guidance students based on daily activities monitoring

School monitor systems around the world are increasing to use the new technology and communication tools such as apps, robots, and multimedia platform to obtain children activities data for transformation of the teaching-learning process as well as others conceptual development. Overall parental perception is defined as parental satisfaction which is measured by rating level (5 levels) by numbers of selected participants.

- Can AI technology learn more about childhood potential strengths or weaknesses and then pass on information to parents.

With the capability of AI-Technology, there can be tailored build to fulfill the data capturing system for fully understand each child learning behavioral and childcare center functional setup. Although AI-Technology can learn from children, but such information may involve personal privacy and confidential argument for data exchange among childcare centers, parents, and educators.

- Effectiveness of AI technology for services, as well as an early warning to identify potential risks

Lee, Kozar, & Larsen (2003) the big data is generally described the terms of 3V: volume, variety, and velocity. A granular database can allow analysis to perform better, variety data adds the ability and opportunity to enable unanticipated and unknow situation and predictions. Data streaming technology in real-time sharing from online devices or mobile facilities also analyze promptly. How parental seeing the regulatory approval within the facilities and standardization among others, as well as data might be deployed to unauthorize analysis, although able to prevent any potential risk (Venkatesh, & Davis, 2000).

- The criteria of different operating procedure and process can be used for the high level of service standard

Standardize and rigorous operating procedure was leading childcare services in past decades and to comply following industry regulations and government law. Vandell & Wolfe (2000) suggest that quality of standardize operating procedures (SOP) plays an important role in any organization to ensure quality services, create efficiencies and profitability, reliability and consistency. AI technology development is based on data capturing, data training with flexibility, and operate by smart devices, that might create any conflicts between caregivers (Venkatesh, & Davis, 2000).

This study examined parental perceptions in service quality of childcare adept with AI-Technology, and the satisfactory level in 5 dimensions of SERVQUAL model. A framework will develop based on the theoretical and literature review, specific hypotheses will testify by captured data and extracted report. And identify the implication of AI-Technology enabled facility for quality service which parental perceived.

H¹ – *null*: Childcare service by users had the same perception on AI-Technology promote in childcare center.

H² – *alternative*: Parenthood demographic of Education level had a different view of AI Technology into childcare services.

This study uses questionnaires for capturing empirical data completed by parents to investigate and examine associates among childcare centers, parents' perspectives and services quality in relative to AI-Technology enabled system. The findings of this research are significant for the following reasons:

- a. A variety of data collected able to describe and represent different populations of parents' perception,
- b. The results may demonstrate what childcare needs to maintain quality levels affects in parental demographic characteristics on technology acceptance approach,
- c. The findings may be able to provide and inform childcare professionals, operators, caregivers, and parents of important factors for future consideration,
- d. The results provide an important message for policy and legal recommendations to ensure the quality of the service aligned for AI-Technology integration into the childcare industry.

Review of Literature

To obtain a better understanding and gain appreciation of AI-Technology integrating into childcare campus, this study contains four main research areas that are important for understanding and facilitate existing literature relative to parental perceptions, services satisfaction and the market position of AI-Technology enable.

Technological Perspectives: Artificial intelligent technology (AI)

Since the early 50s, computing learning was brought by Alan Turing and echoed by John McCarthy and Marvin Minsky, AI-Technology initiatives in manufacturing has been a popular topic of research interest for the last 3 decades. In recent years, machine operation has performed or exceeded human performance in many cognitive tasks, and challenges that have plagued scientists in the field of artificial intelligence, such as catastrophic forgetting in continuous learning and the problem of learning rate in deep-enhanced learning, have been gradually overcome. But are machines really smart? Can artificial intelligence reach or surpass human capabilities? How can artificial enhancement expand human expertise and help us overcome real-world challenges? (Lowther, Inan, Daniel Strahl, & Ross, 2008). In recent years, advances in artificial intelligence have relied on technologies such as deep learning, multi-layered artificial neural networks, and big

data. With a sufficient number of tagged training data sets and computing power (using GPU acceleration technology), this deep learning technique can make AI more effective than ever before. Since artificial intelligence is so hot in the market, the relevant research has been more than half a century. We are now in the development of artificial intelligence technology at what stage? First, AI can be divided into three types according to its intelligence capabilities: Narrow AI, Broad AI, and General AI (Lowther et al. 2008); Barr, & Feigenbaum 2014). They also emphasized the most powerful is "General Artificial Intelligence", described as being able to think, reasoning and learning as much as humans, but this type of artificial intelligence technology is extremely difficult and is still a science fiction concept. The least difficult and relatively mature is "Narrow Artificial Intelligence", which means that artificial intelligence systems can perform a single task in a single area, such as computer vision recognition (CVR), speech recognition, and language translation, which have penetrated our daily living, such as the e-trade service for personalized marketing (Mitchell, Michalski, & Carbonell, 2013).

However, in practice, there are still many problems with narrow AI-Technology, and still need more advanced technology to effectively apply AI to solve complex problems in the real world. More importantly, in addition to providing highly reliable and accurate models, AI systems need models to produce results that are fair, trustworthy, and explanatory. Not only do they need to be able to combine knowledge and reasoning, and also need to be self-training and be able to continuously improve performance and implement more complex functions (Mitchell et al. 2013). AI-Technology enabled system has great potential in the vertical sectors of retail, services, transportation and automation, manufacturing, and agriculture. The main driving factor in the market is the increasing number of applications of artificial intelligence technology in various end-user vertical areas, especially to improve the service to end-consumers (Barr, & Feigenbaum 2014).

"...The global artificial intelligence (AI) market size was valued at USD 27.23 billion in 2019 and is projected to reach USD 266.92 billion by 2027, exhibiting a GAGR of 33.2% during the forecast period."

Based on Fortune Business Insights 2020 indicated that the healthcare industry is expected to earn significant gain from AI-Technology applications. During the century pandemic outbreak, the AI market is considerably growing significantly due to the

capability to improve accuracy in diagnostics and predictions. All of Hong Kong businesses are regulated to have the Non-contact Temperature Assessment device for operation, most educational facilities such as schools, kindergartens, learning, and childcare centers are requested multi-units for better safety support. The main aim of AI-Technology for school attendance system is face recognition which is the biometric database with face image or video for real-time variation, that could save time and avoid any human errors, can be used as security purpose, reduces malfunction and manipulation by employees as well as students (IDC Business Research 2020). In Hong Kong, any biometric data such as facial recognition technology is the individual personal data under the Personal Data (Privacy) Ordinance (PDPO) and regulated by the provisions of the Ordinance.

Theoretical Perspectives: SERVQUAL Measurement

The quality of childcare services depends on many factors such as brand awareness, tuition fees, caregivers' qualification, social resources, referral commentary, programs, activities, safety facility, family economics, location convenience, communication and parental beliefs and value (Dettling, Parker, Lane, Sebanc & Gunnar, 2000). In many studies, the SERVQUAL instrument was used for evaluating the quality of the services in different services industry. Parasuraman, Zeithaml, & Berry (1985) claimed that the results of a comparison between consumer expectations and Consumer perceptions of services are defined as the quality of services performed. They also indicated that service quality is harder to measure than products; the result of service evaluation is only obtaining the outcome, how about the services' processing, which is very important for further improvement. In the earlier study, the SERVQUAL model was defined into ten dimensions, but after consolidation, five dimensions were proposed the measures technique which globally and widely used to evaluates the service quality as well as improvement instrument.

The table below show the consolidation from 10 to 5 dimensions with definition:

1	Tangibles	Facility, teaching method, equipment, tools and system, High price, Price increase, Deceptive	Dimension 1 (Tangibles)
2	Reliability	Service dependably, accurately, service mistakes, & catastrophe,	Dimension 2 (Reliability)
3	Responsiveness	Willingness/capable to accommodate demand, proactive, commitment for assurance,	Dimension 3 (Responsiveness)
4	Communication	Knowledge, reputation, characteristics, involvement, financial security, ability, trustworthiness, safe, service support, confidentiality, knowledge & skills, consideration	Dimension 4 (Assurance)
5	Credibility		
6	Security		
7	Competence		
8	Courtesy		
9	Understanding	Caring, Provider direct service, Employee understand & interest, Ethical issues, recognizing, convenient, location, easily accessible	Dimension 5 (Empathy)
10	Access		

Fundamental of the five dimensions that are made use of evaluating service qualities can be captured in different score which G is the perceived quality, P is the consumers' perception, and E is the services expected.

$$G = P - E$$

Due to technology growth into many industries, such as computing, decentralization and sources of supply chain alternative, (Mathieson, Peacock, & Chin, 2001) were modified user information satisfaction (UIS) apply to organization's information services function (ISF) setting which is more effective to determine the levels of services quality measurement of information system (IS) services provided. And also echoed with (Parasuramen et al. 1991) and found that, Tangibles (TANG-SQ), Responsiveness (REL-SQ) and Assurance (ASSU-SQ) for measuring user information satisfaction (UIS) remain

key predictors. However, another two dimensions of IS services quality, Reliability and Empathy are more significant to evaluate and predict the results.

In this study, researcher adopted core definition in relative with objectives as follow:

Dimensions	Definition proposed
Tangibles	Physical facilities with AI-Technology enabled attendance system (AIAS)
Reliability	Capability to provide services accurately and dependably
Responsiveness	Willingness to perform services to accommodate children, caregivers, and parents' demand proactively
Assurance	Knowledge and courtesy to earn parents, caregivers with capability to inspire confidence and trust
Empathy	Caring and attention to individual of services provider toward children, caregivers, and parents

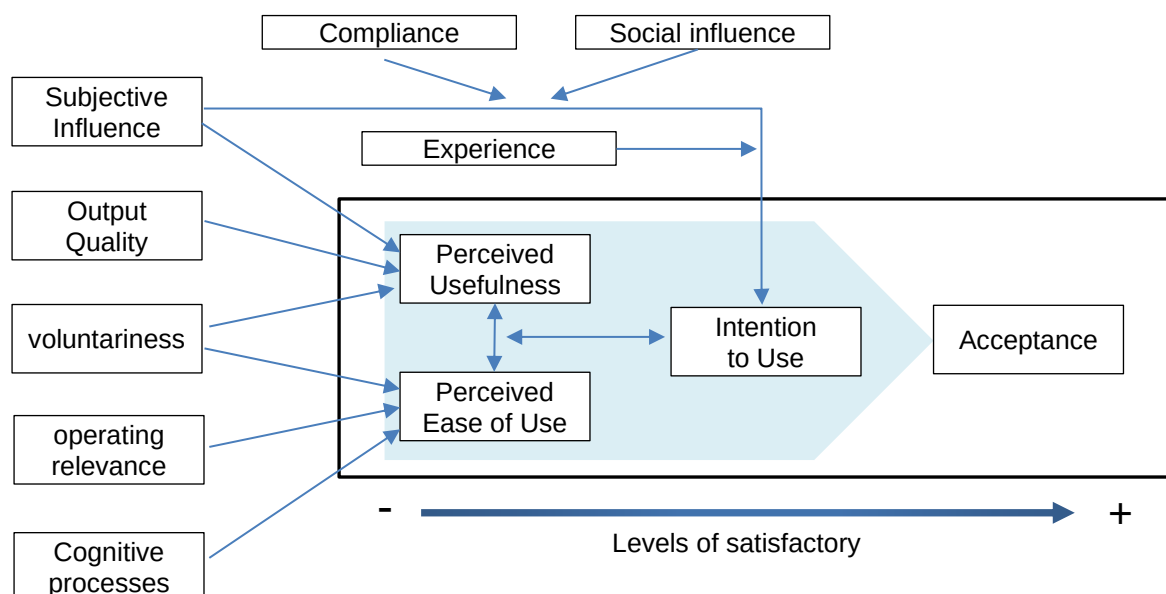
User acceptance level - Technology Acceptance Model

Over the past decades, many of new technology adoption has not been successfully implement and perform well enough to meet the initial expectation (Parasuramen et al. 1991; Davis 1993). Most of the cases were rejected and ignored by end-user, external factors of influence by users' behavioral intentions. Underlying of Theory of Reasoned Action (TRA), to explained and predict end user's acceptance of the development trend of new information system technology mainly are user internal beliefs, attitudes and intension, TAM theory holds that when users face new technology, perceived usefulness and perceived ease of operating are the two keys factors (David 1989; 1993). In particular, numerous empirical studies have been found that TAM has two main factors: 1). Perceived Eise of Use (PEOU), when using a particular system, users think they can save time and effort; 2). Perceived Usefulness (Perceived Usefulness, PU), which the degree of a user subjectively believes that a particular system has resulted in an improvement in job performance, the higher of users' perceived ease of use, the more active of attitude towards to use, also of the greater the perceived usefulness of use (David 1993). TAM

theory also emphasized that the effects of external variables such as the characteristics of system, development process, social impacts, and training are intervened by perceived ease of use and perceived usefulness. In the last decade, although TAM has well established with a simple and powerful tool for prediction or user acceptance, but other studies proposed that various individual's perception, managerial influence, situational phenomenon, economic scale, organization financial support, and user demographic could intervene in the level of acceptance (Mathieson, Peacock, & Chin 2001).

In the childcare industry, any advanced technology integrating should benefit the children and caregivers, but parents are the ones to pay for those services. For this study, the researcher classified most of service recipient are not able to provide third-party insights and technology innovation has a positive intention, the proposed below (Figure 2) is the constructs and rational analysis of the TAM extended model which to testify the study hypothesis which spanning subjective influence, quality of output, voluntariness, operating relevance, cognitive processes.

Figure 2: Technology Acceptance Model
Source: proposed by researcher



Mathieson et al. (2001) identified that social influence is one of the effects of the most significant factors of subjective norm on intention to obtain technological enabled system, individual tented to respond social influences within favorable and reference group. Besides, the direct compliance affects the intention of perceived usefulness to operate which may not occur involuntarily, such an approach might be able to establish and meet

the existing legal and regulatory framework, and the conflict of unwilling decision to be non-mandatory. However, since the user intention and perception can change by any external factor's overtimes, it is important to measure frequently, but David (1993) argued that user acceptance of information technology is a complex and elusiveness transaction among any organizations, yet indeed an important business phenomenon, thus, such advance progress might need to develop and test toward unraveling the mystery.

Parents perception of childcare quality

Many studies were trying to define and understand the root process behind parents' perception of services quality of childcare centers, in particular the aspects of childcare set up, development and structural characteristics, pedagogical methods, and social-cognitive factors (Vandell & Wolfe 2000). The technological information integrates into childcare services platform need to consider a multiple of service dimensions to understand and rate the complexity of parental perception simultaneously. Zellman & Perlman (2006) suggested and focused on four key aspects of childcare quality:

- 1) Structure and strategies to support childhood emotional and social development, the importance of supportive caregiving developmentally, and practices which consistently top-rated by parental.
- 2) The sensitive of caregiving daily practices, care provider who tracks children's on-going development and growth path for using technology-enabled assessment or monitoring tools as extremely important.
- 3) The implementation of appropriate instructional caregiving practices, caregiver encourages children to control behavior and communicate with parents to set the child's goal.
- 4) The cultural gap in between caregiver, parents, childhood and childcare center operator, to ensure provider can well familiarity each background, habits and culturally responsive.

Childcare service is just like the child's legal guardians during the service of care of child with two key functions, to cultivate the emotional, social, physical and childhood cognitive development of children, and to provide the free time for parents, especially mother, able to attend work for income generate (Torquati, Raikes & Huddleston-Casas, 2007). Meanwhile, parents are concerned with the service level which is matching their

expectation and services feature that leads to quality satisfaction, align with current market requirements and service provider able to pay attention on parental relationship (Naik 2010; Coelho & Henseler 2012). There are multiple factors and criteria which parents often to considered, branding reputation, daily activities for child, trust, warmth, caregivers' education background and experiences, physical facilities, providers' supportive and credentials are the most important, another like ethnicity and race, language matching, enrolling process, customer relation platform, and special arrangement for the child were not that important, but such as factors like location, price, school uniform, type of academics were not in the top priority (Shpancer 1999; Zellman, & Perlman 2006; Knoche, Peterson, Edwards, & Jeon 2006).

Based on relative literatures reviewed, the evidence shown that service quality is the key component for a competitive edge in the marketplace. Dettling, Parker, Lane, Seban, & Gunnar (2000) pointed out, childcare service providers should measure from different angles and flexible enough to adapt to the rapid change of the business environment. In past decades ago, the concepts of service quality have been discussed and attracted by many scholars, and leads to extensive effects profitability, internal and external satisfaction, operation enhancement, improve business performance, overcome competitors, customer retaining, gain competitive advantage and sustainable growth. Knoche et al. (2006) argued that to improve has to be service value-added such as technology enable, data support and seamless and transparent communication among parents, and importantly for government support.

Methodology

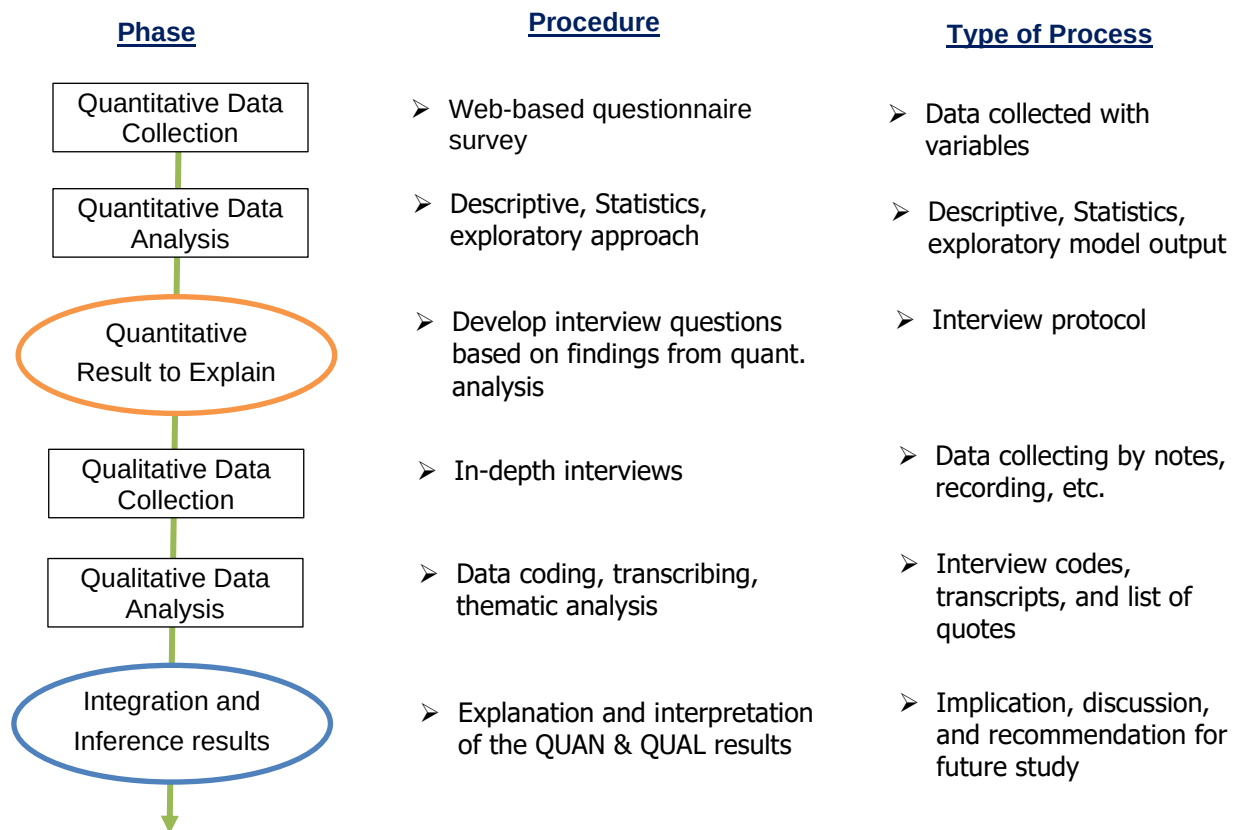
A new research revolution that appeared in the early 1980s which aimed to release the tensions between quantitative and qualitative methodological, is drawing much attention and interest across many academic areas. The norm of Mixed Method is a multi-paradigmatic body, methodological inventiveness, and widespread boundaries of applied evaluation and social research (Bryman 2006). This study was guided by Explanatory Sequential Mixed Method (ESMM), which the combination of different methodology to investigate the research objective and questions, Ivankova, Creswell, & Stick, (2006)

defined that ESMM is the processes for mixing and integrating qualitative and quantitative data with structural design of data collecting, data extraction, analysis and data integrating. Tashakkori, Teddlie, & Teddlie (1998) suggested that to integrate in the sequential design with qualitative and quantitative could be entrusted with drawing inference from the data collected, and the prioritizing and procedural of the qualitative, quantitative, and another methodological approach could be a challenge. Tashakkori et al. (1998) also claimed that the implementation of the mixing process could be longer due to data collecting and analysis are progress in sequence over two consecutive phases, follow one each other. In the study of Bryman (2006) stated that qualitative research is frequently emphasis on strategy with a relatively open-ended solicit approach and depicted new insights and often change direction to produces surprise; nevertheless, quantitative research is a scientific mechanical application which analysis by non-biased tools to define results which based on real reality and existing phenomenon in no new insights, and result in new understanding by imaginative descriptive application.

The present research explored a variety of factors based on the SERVQUAL model which related to parental perception on service quality for AI-Technology enabled attendance system into childcare center. The study participants were drawn from numbers of parents, caregivers, childcare operators, and industry involvers. Primary and secondary data was generated from different areas, part of primary data was collected by face-to-face interviews, focus groups, industry expertise, and survey questionnaires. The researcher is chief operating office in one of Hong Kong-listed education group, business includes youth dance academy, kindergarten, learning centers, and another educational relative business line, the company owns 72 childcare centers within Hong Kong, Thailand, Singapore, Australia, and numerous affiliate childcare centers within Asia Pacific Region.

Ivankova et al. (2006) suggested that experimental study is based on individuals' perception in different service aspects, researchers should give first attention to quantitative approach and data collection. Tashakkori (1998) and Creswell, Plano Clark, Gutmann, & Hanson, (2003) proposed a visual model for mixed methods design to provide the researcher a practical tool to outline and illustrate the analysis procedures. Mixed methods always involve multistage, the researcher needs to visualize the data sample in sequence, and able to connect all variables to better understand how, where, and when to make arguments and recommendations. This model describes the research activities

sequence and point out the priority of each research methodologies and stage of study. It also shows the interaction points among different phases, finally specific outline the integrating of the results of both qualitative and quantitative outcomes (Tashakkori et al. 1998; Ivankova et al. 2006 & Creswell et al. 2003). Figure 3 is the Visual Model for Explanatory Sequential Mixed Method design procedures for this study:



In this pilot-test, due to time constrain, the researcher composed and conducted a constructive survey questionnaire randomly served to numbers of participants (n=45), this minimal data sample size generated should be able to testify to the pilot research needs. Reasons for conducting this pilot test was to find out the initial evidence of the selected research instrument, to explore the validity and reliability of this study. The survey questionnaire needs to be unbiased and with scale rating in multiple-choice format, should be able to obtain better measurement of participants' subjective opinions, insights, experiences, behaviors, views, and personal perspective.

The sample population of this research includes childcare parents, a convenient sampling with systematic were used because of researcher background. The web-based survey by

Google form was distributed to selected participants. Survey also included an introduction page of research purpose as well as the survey guideline:

“..... With the continued rise in the application of big data, educators also see considerable development and progress with technology into childcare services development.

The overall objectives are to examine the dimensions of parental perceptions of child-care services by using SERVQUAL instrument about AI Technology integrate into the student's monitoring system at the childcare centre.

Services quality and value affecting parent's satisfaction in a Childcare Centre using AI technology into operating in Hong Kong”

This research instrument was constructed with two parts, the first part of the questionnaire included demographic information (10 items) of direct construct on participants' demography varies, gender, age, marital status, education level, employment status, household income, type of childcare service use, spending and area they live. In the second section, parents were asked indirect constructs questions (30 items), all of the questions are based on the five dimensions of the SERQUAL service measurement model, tangibles, reliability, responsiveness, assurance, and empathy in different variables which to testify to the specific hypotheses with selected conceptual frameworks to label the parental experiences to determine the difference (Creswell et al. 2003). Also, the questionnaire was multiple-choice, and also forced choice, 5 scales were using from strongly disagree to strongly agree, full questionnaire on appendix 1 and below figure 4 shows the "Sampling Method".

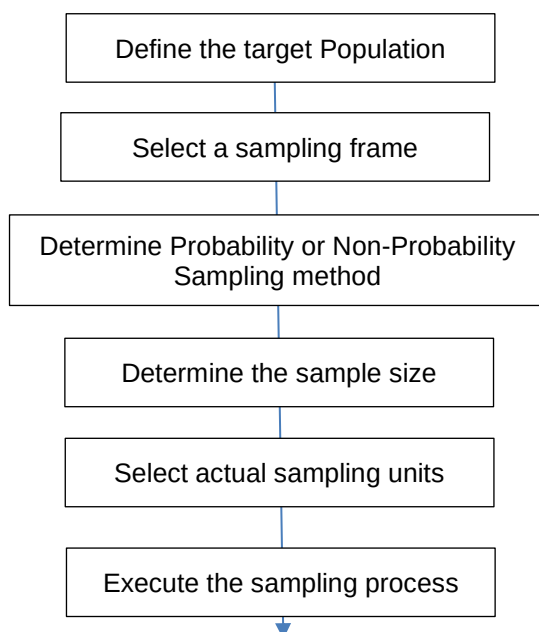


Figure 4: The Sampling Design Process

Ivankova et al. (2006) claimed that was the significant process to provide evidence for the validity and reliability of the outcome of expectations. Correlations were calculated and compared with, high reliability which should have a strong correlation, and weak correlations also indicated may not be reliable. In this study, different ways were measured validity, based on literature review was used and to measure the construct validity coefficient is ≥ 0.70 was applied. The researcher addressed how rigorously of reliability and validity in different issues and what essential components or dimensions to influence the decisions of parental perception and implementation of AI-Technology attendance system into childcare center. That will be able to evaluate the reliability and validity of this research and make further progress based on the findings if necessary.

The most significant limitation associated with this research involved the lack of experience and knowledge of AI-Technology among participants, as well as the common practice of childcare phenomenon because of the popularity of domestic helper in Hong Kong. Low response rate is also an issue for this study due to the resistance culture of Hong Kong people for any market survey. The other limitation is to maintain a simple factor structure data extracting for exploratory study, seems lower internal consistency reliabilities were skewed on the integrity of the survey structure, therefore, in the future, more items and precise factors could be added and not only focus on internal consistency reliability. Over change in time, once more AI-Technology applied to other industries, parental perceptions for this study's objective might be slightly shifting due to regulation, policies, and quality standard also change.

Key Findings

Questionnaire had been used and employed by quantitative method for this study, all collected data extracted and analyzed by SPSS system. Statistical tools include

descriptive statistics (DS) such as summary of participants demographic profile with population, frequency and percentage, standard deviation, correlation factors and mean for information analysis, besides, graphical histograms and tabular are provided for better visualize the results. Followed by inferential statistics (IS) with regression analysis to define the relationship between a dependent variable and one or more independent variables such as t-test, and ANOVA method to analyze variance for H3 tested.

The collected data population for this pilot study is using convenience sampling structure (Creswell 1999) and based on friends, classmates and few of parents from researcher's childcare centers, sample size is very minimal (n=45) and took 5 days to complete.

Demographic Summary

Total distribution sizes for the questionnaire survey were 54, and respondents were 45 (n=45) and analyzed, approximately 57.8 % were females and 42% were males, which explained more female parenthood were the one for taking care of children. The age group for the survey was four valid group, summary shown the majority of respondents were twenty of 35-44 years, approximately 44.4%, and most less group was 55 years and above, total was 7, sharing 15.6%. Based on the age group analyzed, it matched the report of 'Hong Kong Population By-Census 2016', majority of parents age with children age twelve below was 41.7%, thereby, summary shown older parents, might be grandparents were less likely visit and obtain childcare services. That also explained the traditional Chinese family culture is tended to grandparents for taking care of child their own instead of childcare services. In the analysis of marital and employment status for forty-five respondents, 86.7% were married and only 13.3% were single and divorced, accounting for divorced should be grouped with single status as well. There are four valid status of parents' employment, summary shown 66.7% were full time employed, and only 8.9% were part-time and retired, frequency for each were 3 and 1, such data sample was not sufficient enough for testify.

This study was focusing on technological background with service quality, therefore, the educational level for respondents is indeed important. Results indicated that the sample of respondents was representative of the population questions, a total of 86.7% were university graduate and 60% were master's degree, and other types such as high school, sub-degree and doctoral are single digit and data sample is not significant enough. The

results indicated that respondents are well educated enough for understanding the research objectives of this study, nevertheless, compared with employment status, over 90% of respondents are full-time and self-employed, much reflected better education background toward better employment status. Family household income of the survey was ranged from \$29,999 and below to \$100,000 and above, fourteen participants had income over \$100,000 monthly. Forty-four percent of respondents are living in Honk Kong Island and fifty-four percent were from Kowloon and New Territories, result indicated the similarities of Hong Kong population spread. Below table 1a shown the demographic summary for parents' gender, age group, marital and employment status:

Table 1a: Demographics Summary

Gender	Frequency (n=45)	Percentage %
Female	26	57.8 %
Male	19	42.2 %
Parents age group	Frequency (n=45)	Percentage %
34 years old and below	9	20.0 %
35 to 44 years old	20	44.4 %
45 to 54 years old	9	20.0 %
55 years old and above	7	15.6 %
Marital Status	Frequency (n=45)	Percentage %
Married	39	86.7 %
Divorced	4	8.9 %
Single	2	4.4 %
Employment Status	Frequency (n=45)	Percentage %
Full-time	30	66.7 %
Self Employed	11	24.4 %
Part-time	3	6.7 %
Retired	1	2.2 %
Education Background	Frequency (n=45)	Percentage %
High School	2	4.4 %
Sub-Degree	2	4.4 %
Bachelor's Degree	21	46.7 %
Master's Degree	18	40.0 %
Doctoral Degree	2	4.4 %

Table 1a: Demographics Summary

Family Household income	Frequency (n=45)	Percentage %
\$29,999 and below	4	8.9 %
\$ 30,000 to \$ 49,999	12	26.7 %
\$ 50,000 to \$ 74,999	9	20.0 %
\$ 75,000 to \$ 99,999	6	13.3 %
\$ 100,000 and above	14	31.1 %
Region of Living	Frequency (n=45)	Percentage %
Hong Kong Island	20	44.4 %
Kowloon	12	26.7 %
New Territories	12	26.7 %
Mainland China	1	2.2 %

Background information of Childcare service for respondents such as child age, service type and monthly spending were analysed. Due to small sample sizes, result shown quite evenly on child age. Thirty-six percent reported full day childcare services were using, which is the majority of the result, and only two participants had not obtained any services. The summary of the monthly spending on childcare services showed that the majority spending is HKD 4,000 to 4,999 was twenty-six respondents, more than half of the parents were fall in this category and the percentage is almost same as report of “2018 *The Parenting practices in Hong Kong*” (Family Health Service 2018). Report indicated that average Hong Kong parents spent HKD 63,000 annually on childcare service excluded the expenditure of family domestic helper. Table 1b presents the childcare care services experiences for respondents.

Table 1b: Childcare services experiences

Child Age	Frequency (n=45)	Percentage %
2 Years and below	10	22.2 %
3 to 4 Years Old	10	22.2 %
5 to 6 Years Old	7	15.6 %
7 to 8 Years Old	4	8.9 %
9 Years and Above	14	31.1 %

Service Type	Frequency (n=45)	Percentage %
Occasional Service	6	13.3 %
Play Group	8	17.8 %
Pre-School	7	15.6 %
Half-Day	6	13.3 %
Full-Day	16	35.6 %
None	2	4.4 %

Monthly Spending	Frequency (n=45)	Percentage %
\$ 1,999 and Below	3	6.7 %
\$ 2,000 to \$ 2,999	4	8.9 %
\$ 3,000 to \$ 3,999	8	17.8 %
\$ 4,000 to \$ 4,999	26	57.8 %
\$ 5,000 and Above	4	8.9 %

Reliability Result

To make sure all questions are fitting and reliable to this study as well as understandable, a reliability test was conducted. The below (table 2a) shown the overall Cronbach's Alpha (α) for variables is $\alpha = 0.865$ and itemized result presented everyone was $\alpha = 0.80$ and above, based on standardized items is $\alpha = 0.869$ with 30 items. Acceptance Alpha value for this study is $\alpha \geq 0.7$ (Creswell 1999), most studies in the past that have used alpha imply greater than 0.7 is adequate and uninterpreted. Cortina (1993) noted in his study that if bigger scale will have better alpha (α) even with modest intercorrelations item with two orthogonal dimensions the result indicated and proofed that all items are understandable and reliable as the general rule of acceptance level of Alpha value was exceed and greater than 0.7, meaning can be explained by the model. Table 2b is an itemize of total statistics, which detailly summarize each variable scoring, analyzed all variables' Alpha are ≥ 0.7 , indicated that each are reliable and understandable.

variables	Cronbach's Alpha (α)	Cronbach's Alpha based on standardized items	Number of items
Parental perception on service quality for childcare centre	0.865	0,869	30

Table 2a: Reliability Statistics (30 items)

	Item-Total Statistics			Cronbach's Alpha if Item Deleted α
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	
Updated Appearance	112.98	107.568	0.188	0.867
Visually Appealing	112.98	104.977	0.424	0.860
Promote Learning	112.84	107.589	0.193	0.867
User Friendly	112.93	107.564	0.198	0.866
Teaching Aid	112.93	107.791	0.260	0.864
New Experience	112.78	107.449	0.234	0.865
Functional	113.09	102.219	0.534	0.857
Worry-Free Equipment	113.56	105.525	0.268	0.865
Effective AI Technology	113.09	103.992	0.364	0.862
Avoid Error	113.29	102.256	0.607	0.856
Conflict Others	113.76	107.098	0.187	0.868
Data Matching	113.04	106.907	0.296	0.863
Respond Needs	113.22	98.404	0.723	0.851
Respond Demand	113.31	100.128	0.663	0.854
Commitment	113.22	103.813	0.469	0.859
Adopt Information	113.13	105.118	0.525	0.859
Provide Information	112.96	101.634	0.622	0.855
Identify Needs	113.02	103.386	0.489	0.859
Sufficient Knowledge	113.56	104.343	0.455	0.860
Feeling Safe	113.47	100.527	0.556	0.856
Provider Trust	112.80	104.891	0.391	0.861
Technical Support	113.04	105.043	0.389	0.861
Privacy Data	112.73	113.882	-0.176	0.875
Ongoing Upgrade	112.98	105.568	0.383	0.861
Attention Children	113.44	102.207	0.555	0.857
Health Monitoring	113.09	104.992	0.394	0.861
Employee Understanding	112.82	107.195	0.245	0.865
Parent Interest	113.18	105.422	0.355	0.862
Identify Disposition	113.38	102.513	0.628	0.856
Growth Development	113.02	103.431	0.485	0.859

Measurement reliability was assessed with each variable with the five dimensions (Figure 2b) of service quality shows that all Alpha values are greater than 0.70. The results indicated an α value 0.860-0.867 for tangible dimension, 0.857-0.868 for reliability, 0.851-0.859 for responsiveness, 0.860-0.875 for assurance, and 0.857-0.865 for empathy. Composite reliability reflected the internal consistency of all indicate factors for measuring, as shown each score SERVQUAL dimensions are relatively high. Compared with the reliability measurement of user satisfaction index which suggested by Johns (1981), the proposed Alpha values were tangible ≥ 0.810 , reliability ≥ 0.840 , responsiveness ≥ 0.790 , assurance ≥ 0.730 an empathy ≥ 0.790 , meaning these different instruments were strongly consistent reliable and indeed engaged the underlying construct among respondents.

			Mean	Std. Deviation
Tangible	1	Updated Appearance	4.04	0.852
	2	Visually Appealing	4.04	0.706
	3	Promote Learning	4.18	0.834
	4	User Friendly	4.09	0.821
	5	Teaching Aid	4.09	0.633
	6	New Experience	4.24	0.743
Reliability	7	Functional	3.93	0.809
	8	Worry Free Equipment	3.47	0.944
	9	Effective AI Technology	3.93	0.915
	10	Avoid Error	3.73	0.720
	11	Conflict Others	3.27	0.939
	12	Data Matching	3.98	0.690
Responsiveness	13	Respond Needs	3.80	0.869
	14	Respond Demand	3.71	0.815
	15	Commitment	3.80	0.757
	16	Adopt Information	3.89	0.573
	17	Provide Information	4.07	0.751
	18	Identify Needs	4.00	0.769
Assurance	19	Sufficient Knowledge	3.47	0.726
	20	Feeling Safe	3.56	0.918
	21	Provider Trust	4.22	0.765
	22	Technical Support	3.98	0.753
	23	Privacy Data	4.29	0.757
	24	Ongoing Upgrade	4.04	0.706

Empathy	25	Attention Children	3.58	0.783
	26	Health Monitoring	3.93	0.751
	27	Employee Understanding	4.20	0.757
	28	Parent Interest	3.84	0.767
	29	Identify Disposition	3.64	0.679
	30	Growth Development	4.00	0.769

Table 2b: Mean & Standard Deviation

Besides, the results indicated there were four items which both in reliability dimension were relatively high, SD (σ) value were over 0.90, worry-free equipment 0.944, conflicts with other 0.939 and effectiveness of AI-technology 0.915 are in reliability dimension and feeling safe 0.918 in assurance dimension. That means data are more spread out and bigger of variances within different perspectives among respondents, meaning respondents had different views of the captioned variables. And the item in responsiveness dimension – capability to adopt information was 0.573, which indicated the parents' perspective are believed that the capability of adopting information of AI-Technology.

Pearson Correlation Coefficients

To measure the relationship within variables (Pearson r acceptable = ± 0.7 and p -value 0.05 is significant), Pearson Correlation analysis does not accurately detect nonlinear correlations, such as exponential or dictational correlations, where variables are converted before correlation analysis is performed. The relevant analysis cannot directly make causal inference, causal inference must conform to the independence of variables, timing and related, usually also need reference of the logical reasoning process, simply by the relevant analysis is not enough to directly determine the causal relationship between variables (Ullman, & Bentler, 2003).

The analyzed result showed that all Pearson correlation r -value were neither ≤ -0.70 nor ≥ 0.70 , meaning all variables were no relationship between. An example of (Table 2c) indicated that r value in between Data Matching (DM), Worry Equipment (WE) and Privacy Data (PD), DM/WE $r = -0.088$ and WE/PD $r = -0.161$, nevertheless, PD/DM $r = 0.143$, also, all p -value relatively high, that indicated that is insignificant and no relationship in between each variable.

Table 2c: Pearson Correlation Coefficients

Correlations				
<i>Pearson Correlation Coefficients</i>		Data Matching	Worry Equipment	Privacy Data
Data Matching	Pearson Correlation	1	-0.088	0.143
	Sig. (2-tailed)		0.564	0.349
	N	45	45	45
Worry Equipment	Pearson Correlation	-0.088	1	-0.161
	Sig. (2-tailed)	0.564		0.291
	N	45	45	45
Privacy Data	Pearson Correlation	0.143	-0.161	1
	Sig. (2-tailed)	0.349	0.291	
	N	45	45	45

Correlation is significant at the 0.05 level (2-tailed).

Factors Analysis

Based on the items underlying, two factors were identified, tangible and empathy dimensions are concluded on social benefit, reliability, responsiveness and assurance are fallen into confidence benefit. The researcher conducted a factors analysis with the option of suppressing small coefficients of absolute value $\leq 0,40$, after few rounds of removal for those cross-loaded factors, analyzed results indicated that 23 out of 30 items within two factors were considered to represent the correlated variables, and such linear combinations and observed analysis as of the potential factors as well as deletion of error items (Johns 1981; Cortina 1993; Tashakkori et al. 1998). Table 3a presents the factors analysis data with Communality, and Total Variance Explained, Component and Rotated matrix which indicated the summary of those variables.

Table 3a: Communalities

	Initial	Extraction		Initial	Extraction
Updated Appearance	1.000	0.785	Adopt Information	1.000	0.862
Visually Appealing	1.000	0.881	Provide Information	1.000	0.844
Promote Learning	1.000	0.704	Identify Needs	1.000	0.817
User Friendly	1.000	0.829	Sufficient Knowledge	1.000	0.846
Teaching Aid	1.000	0.773	Feeling Safe	1.000	0.883
New Experience	1.000	0.865	Provider Trust	1.000	0.876
Functional	1.000	0.903	Technical Support	1.000	0.922
Worry Free Equipment	1.000	0.805	Privacy Data	1.000	0.859
Effective AI Technology	1.000	0.780	Ongoing Upgrade	1.000	0.804
Avoid Error	1.000	0.870	Attention Children	1.000	0.859
Conflict Others	1.000	0.827	Health Monitoring	1.000	0.759
Data Matching	1.000	0.776	Employee Understanding	1.000	0.876
Respond Needs	1.000	0.846	Parent Interest	1.000	0.782
Respond Demand	1.000	0.780	Identify Disposition	1.000	0.810
Commitment	1.000	0.802	Growth Development	1.000	0.754

The variance explained (Figure 3b) indicated that based on seven components can explain nearly 68% of the variables in the initial thirty variables, in further, nearly 83% of the variables explained over eleven components with only 17% loss. Thus, the researcher aimed to reduce the complexity of the data for future studies.

Table 3b: Total Variance Explained

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	7.288	24.294	24.294
2	3.014	10.046	34.340
3	2.661	8.869	43.208
4	2.407	8.023	51.231
5	1.902	6.339	57.570
6	1.563	5.211	62.781
7	1.426	4.754	67.535
8	1.230	4.099	71.635
9	1.163	3.878	75.513
10	1.105	3.684	79.197
11	1.019	3.397	82.594
12	0.739		

To determine the representing how importance of factors that are highly correlated with different variables, the rotated component matrix could indicate the items (Tashakkori et al. 1998). Researcher based on extraction Method of Principal Component Analysis, which able to assist to understand the behaviors are interrelated within all components, also allocated the obsessive questions in questionnaire, and though this multivariate methodology for transforming data before application (Cohen 1988, Johns 1981; Tashakkori et al. 1998). The result showed that only 23 items were considered to be representative of the determined factors after dropped those cross loaded items, factor one represents social benefits, and factor two is confidence benefits. And the coefficient value was pre-set at ≤ 0.4 for suppress level (Table 3c).

Table 3c: Rotated Component Matrix (after drop the items were cross loaded)

Rotated Component Matrix (23 items)					
Components	Factors		Components	Factors	
	1	2		1	2
Updated Appearance	0.667		Feeling Safe		0.616
Visually Appealing	0.670		Provider Trust		0.699
User Friendly	0.408		Technical Support		0.632
Teaching Aid	0.411		Privacy Data	-0.586	
New Experience	0.408		Ongoing Upgrade		0.586
Worry Free Equipment		0.545	Attention Children	0.542	
Effective AI Technology	0.536		Health Monitoring	0.555	
Data Matching		0.482	Employee Understanding		0.487
Commitment		0.493	Parent Interest		
Adopt Information		0.471	Identify Disposition	0.597	
Identify Needs		0.551	Growth Development	0.627	
Sufficient Knowledge	0.446				

Variation Number Analysis (ANOVA) is used to compare the average differences between multiple groups, and if the group effect is significant, an after-the-fact comparison is made to confirm the differences between the groups, compare whether the average number of samples in multiple groups (more than two groups) is equal (Tashakkori *et al.* 1998).

Variation analysis is used to check whether the average number of multiple sets of samples is equal, not the number of variations. One-factor variation analysis (One-way ANOVA). There is only one variation analysis of self-variants (Tashakkori *et al.* 1998).

Hypotheses Results

The One-Way ANOVA with F-test to determine and evaluate means are all equal within and between groups, it might have random error due to differences between group and the actual population size of sample (Tashakkori *et al.* 1998). Comparing forty-five of different

individuals, whether they had different preferences for the childcare service. Therefore, independent sample single-factor variation analysis is suitable for checking whether there are average differences between multiple sets of independent samples.

H¹ – *null*: Childcare service by users had the same perception on AI-Technology promote in childcare center (Table 3d below shown the analyzed result)

Table 3d: ANOVA Type of services and all variables)

	F	Sig.		F	Sig.
Updated Appearance	0.787	0.565	Adopt Information	1.772	0.141
Visually appealing	1.223	0.317	Provide Information	1.401	0.245
Promote Learning	2.471	0.069	Identify Needs	1.651	0.170
User Friendly	2.361	0.058	Sufficient Knowledge	1.723	0.152
Teaching Aid	0.477	0.791	Feeling Safe	2.289	0.064
New Experience	1.798	0.136	Provider Trust	1.687	0.161
Functional	2.257	0.068	Technical Support	2.188	0.075
Worry Equipment	0.576	0.718	Privacy Data	0.415	0.836
Effective AI Tech	1.450	0.228	Ongoing Upgrade	1.035	0.411
Avoid Error	2.248	0.069	Attention Children	1.145	0.353
Conflict Others	1.669	0.165	Health Monitoring	1.902	0.116
Data Matching	0.980	0.442	Employee Understanding	1.527	0.204
Respond Needs	2.438	0.054	Parent Interest	1.590	0.186
Respond Demand	2.843	0.115	Identify Disposition	0.905	0.488
Commitment	2.182	0.076	Growth Development	0.365	0.869

Table 3d: ANOVA (Type of childcare service and all variables

The above result shown all of the p-value (Sig.) of the dependent variable is greater than 0.05 (p-value ≤ 0.05), meaning statistically insignificant and indicate with strong evidence to retain the null hypothesis (H^1).

H^2 – *alternative*: Parenthood demographic of Education level had a different view of AI Technology into childcare services (Table 3e below shown the analyzed result)

Table 3e: ANOVA (Respondents education level and all variables)

	<i>F</i>	<i>Sig.</i>		<i>F</i>	<i>Sig.</i>
Updated Appearance	0.612	0.657	Adopt Information	1.556	0.205
Visually appealing	0.713	0.588	Provide Information	1.326	0.277
Promote Learning	0.832	0.513	Identify Needs	0.215	0.928
User Friendly	0.301	0.875	Sufficient Knowledge	2.030	0.109
Teaching Aid	0.517	0.724	Feeling Safe	1.128	0.357
New Experience	0.314	0.867	Provider Trust	2.879	0.075
Functional	0.303	0.874	Technical Support	0.676	0.613
Worry Equipment	0.311	0.869	Privacy Data	1.417	0.246
Effective AI Tech	0.611	0.657	Ongoing Upgrade	3.735	0.211
Avoid Error	0.680	0.610	Attention Children	0.884	0.482
Conflict Others	1.218	0.318	Health Monitoring	1.265	0.300
Data Matching	1.685	0.172	Employee Understanding	0.566	0.688
Respond Needs	1.026	0.406	Parent Interest	1.235	0.312
Respond Demand	0.570	0.686	Identify Disposition	1.440	0.239
Commitment	0.826	0.517	Growth Development	0.480	0.750

The above result presented all p-value (Sig.) are higher than 0.05 (acceptance p-value ≤ 0.05), indicated that statistically insignificant provide evidence against it, therefore, the alternative hypothesis (H^2) was not supported.

Discussion and Conclusion

The objective of this pilot study is to be demonstrated and examined the relationship between dimensions of service quality and AI-Technology in childcare services, based on the SERVQUAL model. TAM has proved to be the biggest influence on any industry in past decades, analysed results proved that the acceptance level of parenthood perspective, could be explained by the extended inferential statistics, which data analysis is mainly applied statistically and is divided into two categories: descriptive statistics and inference statistics. The former presents the distribution and value of the basic variables and summarizes the relationship between the variables in a simpler way, such as interactive table columns. The latter validates the relationship between variables with more complex statistical techniques, focuses on describing statistical techniques, and demonstrate simple and effective tools to explore possible interrelations between data and visual variants (Ullman, & Bentler, 2003).

Although parents' perceptions and characteristics were not considered in this study based on a convenient data approach, it seems that various perspectives and views were consistent. Seems like Hong Kong parents were generous accepted for those technology apply in childcare care industry. The findings of this study might have implications for childcare centers for adopting AI-Technology for daily operation, and in terms of support that parenthood like to receive, analyzed result indicated many parents suggested that they would be more positive on tangible dimension (mean 4.04 - 4.24). In the nutshell, the result on Mean indicated that Privacy Data (Mean = 4.29) which is the component of assurance is the higher mean among others (scale from 1 to 5, mean for genera is 3) and Provider trust (Mean = 4.22), besides with Employee understanding (Mean = 4.20), therefore, it is recommended to have further study on this area significant in affecting respectively.

It has been pointing out that the sample size of this study is relatively low, and participants were within our study group, the possibility to generalize the results might not be correlated enough. Therefore, it is suggested to the future research to compose a more structural statistics framework and an in-depth evaluation of the research objectives with qualitative methodology to be verified by comparable research.

Lastly, according to today's business environment, AI-Technology has developed rapidly and impacted on a wide range of industries. With the vigorous of information technology development, researcher may have further study on the implementation of AI Technology to compose an intelligent high-quality tutoring system for childcare center and reliable pedagogical structure for education which could compose a life-long learning model for our children. Nevertheless, AI-Technology enable, sensitivity of personal data could be the key burden for such growth.

--- Total words 7843 ---
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Appendices

Questionnaires Survey

Respondents Demographic:

Gender

☐ Female

☐ Male

Your age

☐ 25-34

☐ 35-44

☐ 45-54

☐ 54+

Marital status

☐ Married

☐ Single

☐ Divorced

Education Background

☐ High school or below

☐ Sub-Degree

☐ Bachelor

☐ Master

☐ Doctoral

Employment status

☐ Self-Employed

☐ Full time

☐ Casual

☐ Study work

☐ Unemployed

☐ Retired

Household Income (HKD monthly)

☐ \$15,000 - \$29,999

☐ \$30,000 - \$49,999

☐ \$50,000 - \$74,999

☐ \$75,000 - \$99,999

☐ \$100,000 or above

Age of children

☐ 6 to 12 months

☐ 1 – 2 years

☐ 3 – 4 years

☐ 5 – 6 years

☐ 7 – 8 years

☐ 9 years or above

Type of childcare service (if any)

- ☐ Long-day
- ☐ Half-day
- ☐ Play group
- ☐ Pre-school
- ☐ Occasional childcare
- ☐ None

Average spending (HKD monthly if any)

- ☐ \$999 or below
- ☐ \$1,000 - \$1,999
- ☐ \$2,000 - \$ 2,999
- ☐ \$3,000 - \$3,999
- ☐ \$4,000 - \$4,999
- ☐ \$5,000 or above

District you live

- ☐ Hong Kong Island ☐ Kowloon
- ☐ New Territories ☐ Mainland China

Descriptive questions (30)

1. Equipment will have an up-to-date and modern appearance

- | | | | | | | |
|-------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------------|
| | 1 | 2 | 3 | 4 | 5 | |
| Strongly Disagree | ☐ | ☐ | ☐ | ☐ | ☐ | Strongly Agree |

2. The childcare should be visually appealing equipped within inside and outdoor areas

- | | | | | | | |
|-------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------------|
| | 1 | 2 | 3 | 4 | 5 | |
| Strongly Disagree | ☐ | ☐ | ☐ | ☐ | ☐ | Strongly Agree |

3. Capability to promote children's autonomy and learning behavioural

- | | | | | | | |
|-------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------------|
| | 1 | 2 | 3 | 4 | 5 | |
| Strongly Disagree | ☐ | ☐ | ☐ | ☐ | ☐ | Strongly Agree |

4. Equipment in facilities should be user-friendly and convenient operating

- | | | | | | | |
|-------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------------|
| | 1 | 2 | 3 | 4 | 5 | |
| Strongly Disagree | ☐ | ☐ | ☐ | ☐ | ☐ | Strongly Agree |

5. Physical equipment in facilities could be the teaching aid

15. System with AI Technology will respond with a high level of commitment for assurance

	1	2	3	4	5	
Strongly Disagree	☐	☐	☐	☐	☐	Strongly Agree

16. AI Technology could proactively adopt information from children and caregivers

	1	2	3	4	5	
Strongly Disagree	☐	☐	☐	☐	☐	Strongly Agree

17. AI Technology could proactively provide information to the childcare centre

	1	2	3	4	5	
Strongly Disagree	☐	☐	☐	☐	☐	Strongly Agree

18. Ability to identify children's needs and to exchange information with caregivers and parents

	1	2	3	4	5	
Strongly Disagree	☐	☐	☐	☐	☐	Strongly Agree

19. AI Technology has sufficient knowledge and capability according to the development stages of children

	1	2	3	4	5	
Strongly Disagree	☐	☐	☐	☐	☐	Strongly Agree

20. Parents feel safe while equipment with AI Technology in place

	1	2	3	4	5	
Strongly Disagree	☐	☐	☐	☐	☐	Strongly Agree

21. Appointed system provider must trustworthy and quality assurance

	1	2	3	4	5	
Strongly Disagree	☐	☐	☐	☐	☐	Strongly Agree

22. Seamless technical support by service provider to avoid any problem

	1	2	3	4	5	
Strongly Disagree	☐	☐	☐	☐	☐	Strongly Agree

23. Parent worry about the level of privacy and confidentiality of personal data

	1	2	3	4	5	
Strongly Disagree	☐	☐	☐	☐	☐	Strongly Agree

24. System providers have the ability and planning for on-going upgrade

Strongly Disagree 1 2 3 4 5 Strongly Agree
☐ ☐ ☐ ☐ ☐

25. System with AI Technology will give children individual attention and specific needs

Strongly Disagree 1 2 3 4 5 Strongly Agree
☐ ☐ ☐ ☐ ☐

26. System will have the ability for health monitoring

Strongly Disagree 1 2 3 4 5 Strongly Agree
☐ ☐ ☐ ☐ ☐

27. The employees of the childcare centre need to understand the objective of technology integration

Strongly Disagree 1 2 3 4 5 Strongly Agree
☐ ☐ ☐ ☐ ☐

28. As parents, are you have a high level of interest in heart for AI Technology?

Strongly Disagree 1 2 3 4 5 Strongly Agree
☐ ☐ ☐ ☐ ☐

29. Able to identify individual disposition and dealt with care fashion

Strongly Disagree 1 2 3 4 5 Strongly Agree
☐ ☐ ☐ ☐ ☐

30. Caregivers of the facility genuinely consider the growth and development of childhood

Strongly Disagree 1 2 3 4 5 Strongly Agree
☐ ☐ ☐ ☐ ☐

Web survey link for questionnaires survey:

<https://docs.google.com/forms/d/1PTLbB4ruPJ7pfLainrGAr--iW9GcwHakT7aciBXsEGY/edit>

Pearson Correlation Coefficient (30 variables)

[illegible]

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