

AN ANALYSIS ON THE SERVICE DIMENSIONS OF NATIONAL YOUTH SKILLS TRAINING INSTITUTES VIA AN INTEGRATED MULTI-ATTRIBUTE DECISION-MAKING PROCEDURE

(Analisis Matra Perkhidmatan Institut Kemahiran Belia Negara melalui
Tatacara Pembuatan Keputusan Multi-Atribut Terintegrasi)

ANATH RAU KRISHNAN*, MAZNAH MAT KASIM, SUDDIN LADA & MINAH JAPANG

ABSTRACT

It is indeed a challenging undertaking for the key players of Malaysian National Youth Skills Training Institutes (IKBNs, in Malay) to decide the finest possible strategies that could significantly enhance their students' satisfaction over their services. It involves the consideration of various service attributes that naturally carry diverse priorities. Therefore, this study aimed at recommending some efficient strategies to improve student satisfaction in IKBNs by systematically uncovering the relative priorities of service dimensions. In this study, we carried out a Delphi survey involving a group of experts to validate the list of service attributes elicited from past literature. A questionnaire, which was designed based on the finalised 41 attributes, was then used to gather the necessary data from a sample of 636 IKBN students. With the help of factor analysis, these 41 attributes were then grouped into nine independent dimensions. Further analysis using the group-based compromised analytical hierarchy process (C-AHP) has identified training tools, training delivery, tangible amenities, student-centred management, and training instructors as the five most salient dimensions of student satisfaction. This study could enable the IKBNs to manage their resource better when improving their services. From the management science perspective, this study has contributed a new hybrid multi-attribute decision-making procedure combining Delphi survey, factor analysis, and group C-AHP. The procedure is appropriate for dealing with any complex decision problems that entail a large set of evaluation attributes.

Keywords: analytical hierarchy process; Delphi survey; TVET services; student satisfaction

ABSTRAK

Ia sememangnya merupakan suatu usaha yang mencabar kepada para pemain utama Institut Kemahiran Belia Negara (IKBN) Malaysia untuk memutuskan strategi terbaik yang dapat meningkatkan kepuasan pelajar terhadap perkhidmatan yang mereka tawarkan. Ia melibatkan pertimbangan pelbagai atribut perkhidmatan yang secara semula jadinya mempunyai tahap keutamaan yang berbeza. Justeru, kajian ini bertujuan untuk mengesyorkan beberapa strategi yang cekap untuk meningkatkan kepuasan pelajar IKBN, dengan mendedahkan secara sistematik keutamaan relatif matra perkhidmatan. Dalam kajian ini, dilaksanakan tinjauan Delphi yang melibatkan sekumpulan pakar untuk mengesahkan senarai atribut perkhidmatan yang dikenal pasti daripada kajian lepas. Suatu soal selidik yang direka berdasarkan 41 atribut, kemudian digunakan untuk mengumpul data yang diperlukan daripada sampel 636 orang pelajar IKBN. Dengan bantuan analisis faktor, 41 atribut ini kemudian digabungkan kepada sembilan matra bebas. Analisis selanjutnya menggunakan proses hierarki analisis kompromi (PHA-B) berasaskan kumpulan telah mengenal pasti alat latihan, penyampaian latihan, kemudahan fizikal, pengurusan berpusatkan pelajar, dan tenaga pengajar sebagai lima matra kepuasan pelajar yang paling mustahak. Menariknya, perkhidmatan sokongan dilaporkan sebagai matra yang paling kurang penting. Hasil kajian ini harus membolehkan IKBN menguruskan sumbernya dengan lebih terurus dalam meningkatkan perkhidmatan mereka. Dari perspektif sains pengurusan, kajian ini telah menyumbangkan suatu tatacara pembuatan keputusan multi-atribut hibrid yang baharu yang menggabungkan tinjauan Delphi, analisis faktor dan PHA-B

berdasarkan kumpulan. Tatacara berkenaan sesuai untuk menangani masalah keputusan yang kompleks yang melibatkan sebilangan besar atribut penilaian.

Kata kunci: proses hierarki analisis; tinjauan Delphi; perkhidmatan TVET; kepuasan pelajar

References

- Aalianvari A., Katibeh H. & Sharifzadeh, M. 2012. Application of fuzzy Delphi AHP method for the estimation and classification of Ghomrud tunnel from groundwater flow hazard. *Arab Journal of Geoscience* **5**(2): 275–284.
- Alias S.Z., Selamat M.N., Alavi K. & Arifin K. 2018. Industry 4.0: A systematic review in technical and vocational education and training. *Jurnal Psikologi Malaysia* **32**(4): 66-74.
- Angiz L.M.Z., Mustafa A., Ghani N.A. & Kamil A.A. 2012. Group decision via usage of analytic hierarchy process and preference aggregation method. *Sains Malaysiana* **41**(3): 361-366.
- Anindo I., Mugambi M. & Matula D. 2016. Training equipment and acquisition of employable skills by trainees in public technical and vocational education and training institutions in Nairobi County, Kenya. *Training* **3**(4): 103-110.
- Arambewela R. & Hall J. 2006. A comparative analysis of international education satisfaction using SERVQUAL. *Journal of Services Research* **6**(Special Issue - July): 141-163.
- Asnul Dahar M. & Siti Azizah D. 2011. Factors affecting the selection of design and stitches courses in the Muar, Johor [in Malay]. *Journal of Technical, Vocational & Engineering Education* **4**(December): 58-76.
- Athiyaman A. 1997. Linking student satisfaction and service quality perceptions: The case of university education. *European Journal of Marketing* **31**(7): 528-540.
- Audu R., Musta'amal A.H.B., Kamin Y.B. & Saud, M.S.B. 2013. Provision of workshop tools and equipment: Necessity for technical vocational education graduates skills acquisition. *2nd International Seminar on Quality and Affordable Education (ISQAE)*, pp. 74-78.
- Azam A. 2018. Service quality dimensions and students' satisfaction: A study of Saudi Arabian private higher education institutions. *European Online Journal of Natural and Social Sciences* **7**(2): 275-284.
- Bakar A.R. 2011. Preparing Malaysian youths for the world of work: Roles of technical and vocational education and training (TVET). Universiti Putra Malaysia, Serdang: Penerbit Universiti Putra Malaysia.
- Boulding W., Kalra A., Staelin R. & Zeithaml V.A. 1993. A dynamic process model of service quality: From expectations to behavioral intentions. *Journal of Marketing Research* **30**(1): 7–28.
- Buttle F. 1996. SERVQUAL: Review, critique, research agenda. *European Journal of Marketing* **30**(1): 8-32.
- Chang K. 2015. The use of a hybrid MCDM model for public relations personnel selection. *Informatica* **26**(3): 389-406.
- Chen W.C., Lin Y.F., Liu K.P., Chang H.P., Wang L.Y. & Tai P.H. 2018. A complete MCDM model for NPD performance assessment in an LED-based lighting plant factory. *Mathematical Problems in Engineering* **2018**.
- Custer R., Joseph A. Scarella J.A., & B. Stewart B. 1999. The modified delphi technique - A rotational modification. *Journal of Career and Technical Education* **15**: 50-58.
- de Meyrick J. 2003. The Delphi method and health research. *Health Education* **103**(1): 7-16.
- DeShields Jr O.W., Kara A., & Kaynak E. 2005. Determinants of business student satisfaction and retention in higher education: applying Herzberg's two-factor theory. *International Journal of Educational Management* **19**(2): 128-139.
- Dong Y., Zhang G., Hong W.C. & Xu Y. 2010. Consensus models for AHP group decision making under row geometric mean prioritisation method. *Decision Support Systems* **49**(3): 281-289.
- Douglas J., Douglas A. & Barnes B. 2006. Measuring student satisfaction at a UK university. *Quality Assurance in Education* **14**(3): 251-267.
- Dužević I., Delić M. & Knežević B. 2017. Perceived service quality at private and public higher education institutions. *Journal of System and Management Sciences* **7**(1): 57-65.
- Elliott K.M. & Healy M.A. 2001. Key factors influencing student satisfaction related to recruitment and retention. *Journal of Marketing for Higher Education* **10**(4): 1-11.
- Filyushkina A., Strange N., Löf M., Ezebilo E.E. & Boman M. 2018. Applying the Delphi method to assess impacts of forest management on biodiversity and habitat preservation. *Forest Ecology and Management* **409**(February): 179-189.
- Fink A., Kosecoff J., Chassin M. & Brook R. 1984. Consensus methods: Characteristics and guidelines for use. *American Journal of Public Health* **74**(9): 979-983.
- Forman E. & Peniwati K. 1998. Aggregating individual judgments and priorities with the analytic hierarchy process. *European Journal of Operational Research* **108**(1): 165-169.
- Fornell C. & Larcker D.F. 1981. Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research* **18**(3): 382-388.

- Gruber T., Fuß S., Voss R. & Gläser-Zikuda M. 2010. Examining student satisfaction with higher education services: Using a new measurement tool. *International Journal of Public Sector Management* **23**(2): 105-123.
- Hair J.F., Sarstedt M., Ringle C.M. & Mena J.A. 2012. An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the Academy of Marketing Science* **40**(3): 414-433.
- Halili S.H. 2019. Technological advancements in education 4.0. *The Online Journal of Distance Education and e-Learning* **7**(1): 63-69.
- Hasan H.F.A., Ilias A., Rahman R.A. & Razak M.Z.A. 2009. Service quality and student satisfaction: A case study at private higher education institutions. *International Business Research* **1**(3): 163-175.
- Hirschhorn F. 2018. Reflections on the application of the Delphi method: Lessons from a case in public transport research. *International Journal of Social Research Methodology* **22**(3): 1-14.
- Ho L.W., Lie T.T., Leong P.T. & Clear T. 2018. Developing offshore wind farm siting criteria by using an international Delphi method. *Energy Policy* **113**(February): 53-67.
- Ho W. 2008. Integrated analytic hierarchy process and its applications—A literature review. *European Journal of Operational Research* **186**(1): 211-228.
- Hsu C.C. & Sandford B.A. 2007. The Delphi technique: Making sense of consensus. *Practical Assessment, Research & Evaluation* **12**(10): 1-8.
- Hsu P.F. & Lin F.L. 2013. Developing a decision model for brand naming using Delphi method and analytic hierarchy process. *Asia Pacific Journal of Marketing and Logistics* **25**(2): 187-199.
- Hsu T.H. & Yang T.H. 2000. Application of fuzzy analytic hierarchy process in the selection of advertising media. *Journal of Management and Systems* **7**(1): 19-39.
- Ibrahim M.Z., Ab Rahman M.N. & Yasin R.M. 2014. Determining factors of students' satisfaction with Malaysian Skills Training Institutes. *International Education Studies* **7**(6): 9-24.
- Ishizaka A. & Labib A. 2011. Review of the main developments in the analytic hierarchy process. *Expert Systems with Applications* **38**(11): 14336-14345.
- Jusoh A., Mardani A., Omar R., Štreimikienė D., Khalifah Z. & Sharifara A. 2018. Application of MCDM approach to evaluate the critical success factors of total quality management in the hospitality industry. *Journal of Business Economics and Management* **19**(2): 399-416.
- Kara A.M., Tanui E. & Kalai J.M. 2016. Educational service quality and students' satisfaction in public universities in Kenya. *International Journal of Education and Social Science* **10**(3): 37-48.
- Liao C.N. 2010. Supplier selection project using an integrated Delphi, AHP and Taguchi loss function. *Prostat Forum* **3**(July): 118-134.
- Liu H.H., Yeh Y.Y. & Huang J.J. 2014. Correlated analytic hierarchy process. *Mathematical Problems in Engineering* **4**(3): 1-7.
- Loo R. 2002. The Delphi method: a powerful tool for strategic management. *Policing: An International Journal of Police Strategies & Management* **25**(4): 762-769.
- Mahapatra S.S. & Khan M.S. 2007. A neural network approach for assessing quality in technical education: An empirical study. *International Journal of Productivity and Quality Management Decision* **2**(3): 287-306.
- Mai L.W. 2005. A comparative study between UK and US: The student satisfaction in higher education and its influential factors. *Journal of Marketing Management* **21**(7-8): 859-878.
- Maimunah S., Kaka A. & Finch E. 2009. Factors that influence student's level of satisfaction with regards to higher educational facilities services. *Malaysian Journal of Real Estate* **4**(1): 34-51.
- Murry Jr J. W. & Hammons J.O. 1995. Delphi: A versatile methodology for conducting qualitative research. *The Review of Higher Education* **18**(4): 423-436.
- Napitupulu D., Rahim R., Abdullah D., Setiawan M.I., Abdillah L.A., Ahmar A.S., Simarmata J., Hidayat R., Nurdianto H. & Pranolo A. 2018. Analysis of student satisfaction toward quality of service facility. *Journal of Physics: Conference Series* **954**(1), 012019.
- Nazri E.M., Balhuwaisl M. & Kasim M.M. 2016. A pre-evaluation step towards a guaranteed consistent AHP-based pairwise comparison. *Journal of Advanced Research in Social and Behavioural Sciences* **4**(1): 73-80.
- Novakowski N. & Wellar B. 2008. Using the Delphi technique in normative planning research: Methodological design considerations. *Environment and Planning A* **40**(6): 1485-1500.
- Nunnally J.C. 1978. *Psychometric theory*. 2nd Ed. New York: McGraw-Hill.
- Perçin S. 2009. Evaluation of third-party logistics (3PL) providers by using a two-phase AHP and TOPSIS methodology. *Benchmarking: An International Journal* **16**(5): 588-604.
- Rajaendram R. 2018. Nurul Izzah heads task force to perk up TVET. <https://www.thestar.com.my/news/nation/2018/06/22/nurul-izzah-heads-task-force-to-perk-up-tvet#ddbkdpcIcfQD9QVQ.99> (5 June 2019).
- Ramanathan R. & Ganesh L. S. 1994. Group preference aggregation methods employed in AHP: An evaluation and an intrinsic process for deriving members' weightages. *European Journal of Operational Research* **79**(2): 249-265.
- Reza Afshari A. 2015. Selection of construction project manager by using Delphi and fuzzy linguistic decision making. *Journal of Intelligent & Fuzzy Systems* **28**(6): 2827-2838.
- Saaty T.L. 1980. *The Analytic Hierarchy Process*. New York: McGraw-Hill.

- Saaty T.L. 1989. Group decision making and the AHP. In: Golden B.L., Wasil E.A., Harker P.T. (eds). *The Analytic Hierarchy Process*: 59-67. Berlin, Heidelberg: Springer.
- Saaty T.L. 1995. Transport planning with multiple criteria: The analytic hierarchy process applications and progress review. *Journal of Advanced Transportation* **29**(1): 81-126.
- Santini F.D.O., Ladeira W.J., Sampaio C.H. & da Silva Costa G. 2017. Student satisfaction in higher education: A meta-analytic study. *Journal of Marketing for Higher Education* **27**(1): 1-18.
- Sunindijo R.Y. 2016. Teaching first-year construction management students: Lessons learned from student satisfaction surveys. *International Journal of Construction Education and Research* **12**(4): 243-254.
- Wang Y.M., Xiong L.J., Ma Y., Gao X.L. & Fu W.F. 2016. Construction of competency evaluation measures for operating room nurses. *Chinese Nursing Research* **3**(4): 181-184.
- Xiao J. & Wilkins S. 2015. The effects of lecturer commitment on student perceptions of teaching quality and student satisfaction in Chinese higher education. *Journal of Higher Education Policy and Management* **37**(1): 98-110.
- Yilmaz B. & Nilgun Harmancioglu N.B. 2010. Multi-attributes decision making for water resource management: A case study of the Gediz River Basin, Turkey. *Water SA* **36**(5): 563-576.
- Zardari N.H., Ahmed K., Shirazi S.M. & Yusop Z.B. 2015. *Weighting Methods and Their Effects on Multi-Attributes Decision Making Model Outcomes in Water Resources Management*. Switzerland: Springer International Publishing.
- Zineldin M., Akdag H.C. & Vasicheva V. 2011. Assessing quality in higher education: New criteria for evaluating students' satisfaction. *Quality in Higher Education* **17**(2): 231-243.

Labuan Faculty of International Finance
Universiti Malaysia Sabah
Labuan, MALAYSIA
E-mail: anath_85@ums.edu.my, mina1511@ums.edu.my*

School of Quantitative Sciences
Universiti Utara Malaysia
Sintok, Kedah DA, MALAYSIA
E-mail: maznah@uum.edu.my

Faculty of Business, Economics and Accountancy
Universiti Malaysia Sabah
Kota Kinabalu, Sabah, MALAYSIA
E-mail: suddin@ums.edu.my

Received: 23 October 2020
Accepted: 18 May 2021

* Corresponding author