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# EMPLOYING THE FUZZY DELPHI METHOD TO VALIDATE COMMUNICATION SKILLS AMONG ENGINEERING GRADUATES

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**Abstract**

Delphi strategy may be a method and organized approach utilized to audit and collect suppositions of a gather of specialists, be that as it may, has it possess shortcomings. The Fuzzy Delphi Method (FDM), which is based on a variation of the Delphi method, has been demonstrated to be more successful in showing human phonetic knowledge in numerous tests (which is the signature of the Delphi Procedure). The Fuzzy Delphi Method was used to assess the content of communication abilities among engineering graduates in this article. This stage of development could be part of a larger project to develop a Malaysian employability aptitude system. This stage includes the view of 10 specialists who are experienced and have profound information in designing. It may be a thorough factual examination to approve the legitimacy of the theoretical concept of communication skills. The results of the experts' analysis were presented in the study, as well as the usefulness of the Fuzzy Delphi Method as a tool for gathering information about the validity of communication abilities content. Experts' recognitions have appeared disjointed about communication and get it more than one dialect among engineers. The specialists concurred with building graduates it can be donated by a clear heading, tune in and inquire address in their employability aptitudes capability.

*Keywords: Fuzzy Delphi Method; Validation; Communication Skills; Engineering Employability*



## ■ 1.0 INTRODUCTION

Murray (Murray et al., 1985) proposed the Fuzzy Delphi method, which combined the traditional Delphi strategy with the Fuzzy Set hypothesis. The standard Delphi strategy created by Dalkey and Helmer (1963) was the foremost dependent upon strategy utilized to discover answers inside a set of surveys (Hwang & Lin, 1987; Reza & Vassilis, 1988). This strategy was based on the utilization of phonetic terms. Be that as it may, because of the potential for errors between the implications of the answers taken from the surveys and the elucidation of these answers by specialists, in numerous circumstances, this approach come about in vulnerability and was not appropriately able to reflect quantitative terms. Specialists endeavored to address this 'fuzziness' in terms of understanding the yields of the Delphi strategy utilizing the Fuzzy Set hypothesis (Zaini et al., 2019). The Fuzzy Set hypothesis is an approach that can take after human thinking in its utilization of inexact data and instability to create choices. It was particularly planned to scientifically speak to vulnerability and unclearness and give formalized instruments for managing with the imprecision natural to numerous issues (Kahraman et al., 2004; Williams, 2003; Zadeh, 1965). In this investigation, the productivity of translating surveys comes about maybe much progressed through objective assessment of the components that the Fuzzy Set hypothesis proposes.

To progress the shortcoming related to speculations, Murray, Pipino, and Gigch (1985) proposed to coordinate them. Be that as it may, it was Ishikawa et al. (1993) who combined specialists"‘ suppositions with fluffy numbers based on the concepts of aggregate recurrence dissemination and the fuzzy fundamentally. This handle is called the Fuzzy Delphi strategy (FDM). The most steps of FDM incorporate the taking after 1) Fuzzification; 2) Fuzzy assessment; 3) Triangular fluffy numbers, and 4) Defuzzification. To date, FDM has been extensively used in diverse fields of study, including urban planning, regional road safety, urban road safety, service industries, and health, among others (Yusoff et al., 2021).

The reason for this consideration was to look at the level of agreement among 10 Malaysian specialists within the field of building concerning the communication abilities among engineering graduates, particularly within the Malaysian setting utilizing the Fluffy Delphi Strategy. The taking after was the inquire about address: What do experts believe are the potential of communication abilities within the setting of designing graduates?

## ■ 2.0 LITERATURE REVIEW

The Fuzzy Delphi Technique is a hybrid of the standard Delphi strategy and the fuzzy set hypothesis. Lotfi Zadeh, an arithmetic master, presented the strategy in 1965. (Zadeh, 1965). The Fuzzy set hypothesis instrument is a variation on the standard set hypothesis, in which each component of a set is evaluated using a binary "Yes" or "No" response. According to Bodjanova (2007), the values for numbering fuzzy are between 1 and 1, or if the unit interval is less than one (0, 1). It has been demonstrated in past writing audits that FDM has been utilized as a strategy in different regions, as in building, instruction, and numerous other proficient areas.

A demonstration of communication ability is critical in dealing with this problem. To successfully deliver info in the working sector, communication might be a critical skill that simply addresses the reason, substance, and environment of communication (Cook, 2002; Lappalainen, 2010; Rus, 2014). These abilities can be divided into five categories: a) talk, b) allow course, c) listen in and enquire about the address, d) ideas and e) comprehension abilities (Brinkman & van der Geest, 2003; Cook, 2002; Lappalainen, 2010; McMurrey, 2002; Reaves, 2005; Rus, 2014). Past ponders have identified its significance in preparing understudies for genuine business communication (Lappalainen, 2010; Reaves, 2004; Rus, 2014).

## ■ 3.0 METHODOLOGY

The reason for this ponder is to approve the substance of communication aptitudes among building graduates utilizing Fuzzy Delphi Strategy (FDM) through experts‟ criticism. Ten specialists who are experienced and have profound information in designing included in this think about. The fuzzy Delphi Method was chosen to approve the substance of the communication aptitudes among engineering graduates. Fuzzy Delphi Strategy (FDM) is utilized to recognize, assess, and affirm all the key components and substance of the communication abilities concurring to three terms of the experts‟ assertion which are edge (d) esteem, rate of master assertion, and the esteem of Fuzzy Score (A). The normalization of fuzzy numbers is used in data analysis (defuzzification prepare). To ensure that the third condition is observed, the esteem of the fuzzy score (A) must be greater than or equal to the middle esteem (- cut value) of 0.5 in this study (Tang & Wu, 2010; Bodjanova, 2006). This shows that the component has been recognized by a master comprehension. The value of fluffy scores (A) can be used as a determinant and requirement of a component that agrees with master conclusion views, among other things.

## ■ 4.0 RESULT AND DISCUSSION

### 4.1 Approach to FDM

After the questionnaires were administered, the third phase of the study was the application of the FDM. Based on the questions asked in the questionnaires, the main criteria and their ranking of importance were selected by 10 professionals in different fields of studies, such as executive, civil engineers, businessman, and technical & vocational.

Step 1: The first fuzzy system was designed to understand communication skill quality among engineering graduates, the second one was to understand the engineering student‟s quality, and the third one was to understand if there was a real need for engineering program restructuring.

**Table 1: Communication Skills Assessment Threshold Value**

| Sub-skill | Threshold Value(d) |
|---|---|
| $CS_1$: Communication skills : [Speak in clear Sentences] | 0.183 |
| $CS_2$ : Communication skills : [Give clear direction ] | 0.147 |
| $CS_3$: Communication skills : [Listen and ask a question] | 0.147 |
| $CS_4$: Communication skills : [Ideas presented with confidence and effectiveness] | 0.214 |
| $CS_5$: Communication skills : [Speak and understand more than one language] | 0.189 |

Based on Table 1, there is one threshold value highlighted in red that is approved over the threshold cut-off value of 0.2 (> 0.2), and four threshold value is below 0.2. If the average value of threshold (d) is less than 0.2, the item has reached a well-practiced arrangement (Cheng and Lin, 2002, Chang, Hsu and Chang, 2011).

### 4.2 Fuzzification

The point of the fuzzification step is to decide the mapping degree of fresh inputs to fuzzy sets utilizing enrollment capacities. Within the communication aptitudes Fuzzy framework, five inputs were utilized, specifically: 1) Speak in clear Sentences; 2) Give clear direction; 3) Listen and ask the question; 4) Ideas presented with confident and effective; and 5) Speak and understand more than one language. This input yielded one output: communication skills assessment. The level of agreement for the communication skill among engineering graduates was highly important, important, somewhat important, least important, and not important at all. The levels of the expert consensus on communication skills were very expectant, impartial, and very pessimistic.

Step 2: Calculate the fuzzy average AṼGALL and re-examine (if necessary for each dataset which represents consensus adjustment obtained as:

$$\begin{matrix} 0.700 \\ \square 0.7201 \\ A\tilde{V}GALL = 0.720 \\ I0.660I \\ [0.540] \end{matrix}$$

Step 3: Measure the level of confidence results using alpha (α)-cuts concept via three linguistic variables as defined in Table 3 and employ by Equation (2) as shown in Table 4.

## ■ 5.0 ANALYSIS AND DISCUSSION

The finding of the study found that youth entrepreneurship is a critical initiative of transforming the economy and widening employment opportunities for youth. Entrepreneurship enables youth to participate in developing the economic development of the country through payment of tax and providing employment opportunities to others and formation of the middle class. Young people have the comparative advantage of transforming necessity entrepreneurship into an opportunity or growth-oriented entrepreneurship (Monitoring Group, 2012). A study by Bangura, Mansaray-Pearce, and Kanu(2019) on youth entrepreneurship as an alternative strategy on poverty alleviation in Sierra Leone found that youth entrepreneurship enables youth to realize their dream by having enterprises that increase incomes. According to

This study revealed that youth entrepreneurship is a steppingstone for creating an entrepreneurial culture. According to Palanivelu & Manikandan (2016:1), "entrepreneurship involves life attitude including readiness and courage to act in the social, cultural and economic context. Youth entrepreneurship education prepares young people to be responsible, enterprising individuals …to contribute to economic development and sustainable communities".

The finding of this study noticed that lack of capital for starting and expanding business was a major challenge facing youth entrepreneurship in Zanzibar, Tanzania. Youth are unqualified for a bank loan because they lack collateral, acting as a security for their applications. In addition, it was found that youth are unaware of loan services from microfinance institutions. Capital is a big problem for many entrepreneurial start-ups in sub-Saharan Africa. Biney (2019) found that youth vendors and hawkers are struggling to get a loan from a financial institution because of collateral requirements. According to Ndungu & Anyieni (2019), lack of finance was a major obstacle hindering young to starting and running the business profitably in Kenya.

The results of this study showed that the growth and sustainability of youth enterprises remain a challenge towards the development of youth entrepreneurship. The continuity of youth enterprises remains a concern, as they die in the early years of establishment. It is not surprising to see there is a mushrooming of youth enterprises, but they do not last long. In Botswana, Diraditsile & Maphula (2018) found that youth businesses tend to die less than two years, or sometimes within three to five years because of technical know-how to succeed, and lack of a coping mechanism in the changing business environment.

This study found that lack of entrepreneurial mindset and alertness were still challenges facing youth entrepreneurship. One of the objectives of entrepreneurship education is to increase entrepreneurial mindset and alertness to help youth spot and exploit opportunities for increasing entrepreneurship as a career option (Oluseye, Adebayo, & Olulanu, 2017). It is much argued that "education that influences an entrepreneurial mindset is best achieved through actual performance of tasks relevant to the learning objectives (Robinson & Gough, 2020:6). (Rajeev & Mohamed, 2017) that since entrepreneurial mindset is still a problem among youth in Zanzibar, the incubator has a significant role in addressing this situation. Therefore, the establishment of Zanzibar Technology Business Incubator geared to raising entrepreneurial awareness, skills, and mindset for youth that are critical in job creation.

An unfavorable entrepreneurial ecosystem mired with poor coordination and bureaucracy among public institutions undermines youth entrepreneurship. Youth entrepreneurs need support from public institutions such as training and mentoring to start and formalize their business as well as develop them. Government has a great role to create a conducive environment for youth enterprises to thrive towards economic growth.

Lack of family support also undermines the development of youth entrepreneurs, particularly to non-business-oriented families. Manolova, Edelman, Shirokova, and Tsukanova, (2019) provided two main reasons for the involvement of family in the youth entrepreneurship process. First, young entrepreneurs are still connected closely with their family members, sometimes they live with their families. Second, they are more vulnerable because of lack of experience, social connection, limited know-how. (Manolova et al., 2019:24)observed: "the stronger the family support, the more startup activities undertaken by the nascent entrepreneurs".

## ■ 6.0 IMPLICATIONS OF THE STUDY – RECOMMENDATIONS

The findings of this study provide empirical evidence on the importance of youth entrepreneurship and the need to streamline entrepreneurship in the education system. The study found youth entrepreneurship is a strategic endeavor of transforming necessity entrepreneurship into opportunity entrepreneurship that would increase the livelihood of youth by unlocking their potentials and harnessing entrepreneurial opportunities. It is through the proper promotion of entrepreneurship; the youth will be a productive asset and not a curse scourging stability of the country. Youth entrepreneurship increased more momentum of innovation in the country, which is essential in the development of the country because it spurs private sector development and industrialization that is important for widening employment opportunities. It was found that youth are ready to tap opportunities in the tourism industry, which in turn creates sectoral linkage, for example, agriculture, industry, and tourism.

The results of this study are important inputs for policy intervention to address challenges crippling youth entrepreneurship development in Zanzibar, Tanzania. The study found that youth entrepreneurs have limited access to capital, continuity of enterprises, entrepreneurial mindset, and alertness, which are compounded by poor coordination of public institutions responsible for entrepreneurship development, bureaucracy, and lack of family support. The policy intervention would ameliorate the challenges and help build an entrepreneurial culture for the development of entrepreneurship in the country.

## ■ 7.0 CONCLUSION

This study explored the prospects and challenges of youth entrepreneurship in Zanzibar, Tanzania, using qualitative methods. This study showed that youth entrepreneurship has a significant role in job creation for youth, stimulating innovative initiatives and sectoral linkage as well as building an entrepreneurial culture. However, this study portrayed that youth entrepreneurship is internally constrained by limited access to capital, continuity of enterprises, entrepreneurial mindset, and alertness and externally by poor coordination of public institutions responsible for entrepreneurship development, bureaucracy, and lack of family support. By identifying the prospects and challenges of youth entrepreneurship, this study contributes to the existing evolving research on youth entrepreneurship and becomes a reference for further studies.

## REFERENCES


Afreh, B., Rodgers, P., Vershinina, N., & Williams, C. C. (2019). Varieties of context and informal entrepreneurship: Entrepreneurial activities of migrant youths in rural Ghana. International Journal of Entrepreneurial Behaviour and Research, 25(5), 996–1013. https://doi.org/10.1108/IJEBR-02-2018-0109

Antonaras, A., & Dekoulou, P. (Evi). (2016). Enterprising Culture: Innovation and Value-Network. In H. R. Kaufmann & S. M. R. Shams (Eds.), Entrepreneurial Challenges in the 21st Century: Creating Stakeholder Value Co-Creation (pp. 1–268). Springer Business. https://doi.org/10.1057/9781137479761

Bangura, A., Mansaray-Pearce, S., & Kanu, J. M. (2019). Youth Entrepreneurship ; an Alternative Strategy to Poverty Alleviation in the Mano River Union ( MRU ): Sierra Leone as a Case Study. International Journal of Research in Business Studies and Management, 6(6), 1–12.

Bezu, S., & Holden, S. (2014). Are rural youth in Ethiopia abandoning agriculture? World Development, 64, 259–272. https://doi.org/10.1016/j.worlddev.2014.06.013

Biney, I. K. (2019). Unearthing entrepreneurial opportunities among youth vendors and hawkers: Challenges and strategies. Journal of Innovation and Entrepreneurship, 8(1), 1–14. https://doi.org/10.1186/s13731-018-0099-y

Chellappan, A. P. (2018). Youth Entrepreneurship-Challenges in Kerela. Review of Social Sciences, XIX(1), 1–106.

Chigunta, F. (2002). Youth Entrepreneurship: Meeting the Key Policy Challenges. England: Oxford University Press.

Clarke, V., & Braun, V. (2013). Teaching thematic analysis: Overcoming challenges and developing strategies for effective learning. The Psychologist, 26(2), 120–123.

Creswell, J W. (2014). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Research design qualitative quantitative and mixed methods approaches. https://doi.org/10.1007/s13398-014-0173-7.2

Creswell, John W. (2013). Qualitaitive Inquiry Research Design.Choosing Among Five Approaches (THIRD EDIT). London EC1Y 1SP: SAGE Publications, Inc.

Damoah, O. B. O. (2020). Strategic factors predicting the likelihood of youth entrepreneurship in Ghana: a logistic regression analysis. World Journal of Entrepreneurship, Management and Sustainable Development, 16(4), 389–401. https://doi.org/10.1108/WJEMSD-06-2018-0057

Danns, D. E., & Danns, G. K. (2019). Financing Youth Entrepreneurship in a Developing Country. Quartly Review of Business Disciplines, 6(3).

Dash, M., & Kaur, K. (2012). Youth Entrepreneurship as a Way of Boosting Indian Economic Competitiveness: A Study of Orissa. International Review of Management and Marketing, 2(1), 10–21.

Dawson, C., & Henley, A. (2009). Why Do Individuals Choose Self-Employment ? IZA Discussion Paper No. 3974, (3974), 1–39. Retrieved from http://repec.iza.org/dp3974.pdf

De Gobbi, M. S. (2014). Making Youth Entrepreneurship Work in Sub-Saharan Africa: Some Factors of Success. Open Journal of Business and Management, 2(October), 305–313. https://doi.org/10.4236/ojbm.2014.24036

Diraditsile, K., & Maphula, P. (2018). Entrepreneurship as a mechanism for addressing youth unemployment in Botswana: A reality of idealism? ". International Journal of Development and Sustainability, 7(3), 836–847. Retrieved from www.isdsnet.com

Eren, O., & Sula, O. (2012). The Effect of Ability on Young Men's Self-Employment Decision: Evidence from the NELS. Industrial Relations, 51(4), 916–935. https://doi.org/10.1111/j.1468-232X.2012.00706.x

Ezeh, P. C., Nkamnebe, A. D., & Omodafe, U. P. (2019). Determinants of entrepreneurial intention among undergraduates in a Muslim community. Management Research Review, 43(8), 1013–1030. https://doi.org/10.1108/MRR-09-2018-0348

Green, F. (2013). Youth Entrepreneurship. OECD Centre for Entrepreneurship, SMEs and Local Developmen.

Greenman, A. (2013). Everyday entrepreneurial action and cultural embeddedness: An institutional logics perspective. Entrepreneurship and Regional Development, 25(7–8), 631–653. https://doi.org/10.1080/08985626.2013.829873

Katundu, M. A., & Gabagambi, D. M. (2016). Barriers to Business Start-up among Tanzanian University Graduates: Evidence from the University of Dar-es-salaam. Global Business Review, 17(1), 16–37. https://doi.org/10.1177/0972150915610667

Lofchie, M. F. (1968). Zanzibar Background to Revolution. USA: Princeton University Press. Retrieved from u

Lofstrom, M. (2013). Does self-employment increase the economic well-being of low-skilled workers? Small Business Economics, 40(4), 933–952. https://doi.org/10.1007/s11187-011-9402-z

Manolova, T. S., Edelman, L. F., Shirokova, G., & Tsukanova, T. (2019). Youth entrepreneurship in emerging economies: can family support help navigate institutional voids? Journal of East-West Business, 25(4), 363–395. https://doi.org/10.1080/10669868.2019.1624672

Maritz, A., & Donovan, J. (2015). Entrepreneurship and innovation: Setting an agenda for greater discipline contextualization. Education and Training, 57(1), 74–87. https://doi.org/10.1108/ET-02-2013-0018

McCowan, T., & Steven, D. (2014). Can higher education solve Africa's job crisis? Understanding graduate employability in Sub-Saharan Africa. British Council 2014, 16.

Monitoring Group. (2012). Accelerating Entrepreneurship in Africa Initiative: Understanding Africa Challenges to Creating opportunity driven entrepreneurs.

Ndungu, J. W., & Anyieni, A. (2019). Attitude of the Youth Towards Entrepreneurship : a Case of Nakuru County. International Academic Journal of Innovation, Leadership and Entrepreneurship, 2(2), 211–226.

Ogamba, I. K. (2019). Millennials empowerment: youth entrepreneurship for sustainable development. World Journal of Entrepreneurship, Management and Sustainable Development, 15(3), 267–278. https://doi.org/10.1108/WJEMSD-05-2018-0048

Olufemi, A. (2020). Entrepreneurship : An Option to Solving Unemployment Problem Among Nigerian Youths.

European Business & Management, 6(6), 151–163. https://doi.org/10.11648/j.ebm.20200606.14

Oluseye, M., Adebayo, F., Olulanu, I., Afolabi, M. O., Kareem, F. A., Okubanjo, I. O., … Aninkan, O. O. (2017). Effect of Entrepreneurship Education on Self-Employment Initiatives among Nigerian Science & Technology Students. Journal of Education and Practice, 8(15), 44–51. Retrieved from https://search.proquest.com/docview/1913348830?accountid=12753

Rajeev, A., & Mohamed, A. B. (2017). Fostering Entrepreneurship Development among Youth for Job Creation through Industrial Development: The Case of Zanzibar Technology and Business Incubator. Huria - Journal of the Open University of Tanzania, 24(2), 46–58.

Robinson, P. B., & Gough, V. (2020). The right stuff: Defining and influenceing the entrepreneurial mindset. Journal of Entrepreneurship Education, 23(2), 1.

Schillo, R. S., Persaud, A., & Jin, M. (2016). Entrepreneurial readiness in the context of national systems of entrepreneurship. Small Business Economics, 46(4), 619–637. https://doi.org/10.1007/s11187-016-9709-x

Sharma, L. (2014). Impact of family capital & social capital on youth entrepreneurship – a study of Uttarakhand state, India. Journal of Global Entrepreneurship Research, 5(1), 1–18. https://doi.org/10.1186/s40497-015-0026-7

Sharma, L. (2018). Entrepreneurial intentions and perceived barriers to entrepreneurship among youth in Uttarakhand state of India: A cross-cultural investigation across genders. International Journal of Gender and Entrepreneurship, 10(4), 243–269. https://doi.org/10.1108/IJGE-02-2018-0009