

EXPLORING PERSON-ENVIRONMENT FIT TOWARDS ENHANCING HEARING-IMPAIRED STUDENTS ACADEMIC ACHIEVEMENT IN TERTIARY EDUCATION

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ABSTRACT

Studies involving hearing students at the tertiary level have documented significant predictors of academic achievement relating to various personal and environmental factors. However, relatively little is known about the P-E Fit predictors of hearing-impaired academic achievement in Malaysian tertiary education context. Thus, this paper corresponds to this gap by developing a theoretical framework of hearing-impaired students' academic achievement by implementing the Person-Environment Fit (P-E Fit) concept. Specifically, this framework is developed from the integration of Holland's Typology Theory (1997) and the Work Adjustment Theory (1984). Three main predictors of P-E Fit were suggested; namely personality-major fit (P-M Fit), demands-abilities fit (D-A Fit) and needs-supplies fit (N-S Fit) perception. Apart from that, students' adjustment is also incorporated into the framework since previous studies have determined that hearing-impaired students failed to complete their tertiary education due to several adjustment problems. These adjustment problems consist of social, emotional and academic aspects. As proposed, the developed theoretical framework would lead to an empirical study on academic achievement of hearing-impaired students in Malaysian tertiary education, particularly of those enrolling in Polytechnics Special Skills Certificate. The framework suggested that the congruence between hearing-impaired students' personal characteristics (personalities, abilities and needs) and their environment (academic major, demands and supplies) would lead to students' satisfaction and academic achievement. On the other hand, incongruence between the hearing-impaired students' personal and environmental characteristics would require them to undergo social, emotional and academic adjustments process. Once overall adjustment is achieved, students' satisfaction would also be increased. To conclude, the establishment of adjustment and satisfaction would in turn promote hearing-impaired students academic achievement. Finally, practical and theoretical considerations were also discussed.

Key words: Adjustments, Demands-Abilities Fit, Hearing-Impaired, Needs-Supplies Fit, Personality-Major Fit.

Introduction

Hearing-impaired students have been given opportunity to enrol in tertiary education programs at selected polytechnics as response to Person with Disabilities Act (2008)'s mandate (Ministry of Higher Education Malaysia, 2007). In order to widen the access and equity among the hearing-impaired students, polytechnics provide technical and vocational training in five academic majors namely Graphic Design, Apparel and Fashion Design, Hotel and Catering, Mechanical Maintenance and Civil Construction (Department of Polytechnic Education, 2011). Currently, *Politeknik Sultan Abdul Aziz Shah (PSA)*, *Politeknik Premier Ungku Omar (PUO)*, *Politeknik Premier Ibrahim Sultan (PIS)*, *Politeknik Tuanku Syed Sirajuddin (PTSS)* and *Politeknik Premier Kota Kinabalu (PKK)* served as the main tertiary education providers for the hearing-impaired students via the establishment of Special Skills Certificate programs.

Given such scenario, assumptions could be made that hearing impaired students would be enjoying better academic achievement as compared to those previous days where there were limited access and equity in tertiary education. However, research conducted by Khadijah, Shakila, Rohana & Mariam (2009) found that majority of the hearing-impaired students in Malaysian

tertiary institutions showed relatively lower academic achievement as compared to their hearing peers. Furthermore, previous studies revealed that despite of having relatively lower academic achievement, hearing-impaired students also showed several adjustment problems which would in turn affect their academic achievement (Amatzia, 1989; Lukomski, 2007; Mohanraj & Selvaraj, 2013; Polat, 2003). In fact, hearing-impaired students' adjustment problems are more critical as compared to their hearing peers (Fellinger et al., 2005; Kirk, Gallagher, Anastasiow & Coleman, 2006; van Eldik, 2005; van Gent, Goedhart, Hindley, & Treffers; 2007). Communication difficulty is believed as the main culprit of serious adjustment problems in terms of social, emotional and academic aspects (Bala & Rao, 2007; Kirk et al., 2006).

On top of that, congruence between the students' academic major selection and their personality type is also considered as among the main criteria towards ensuring greater academic success in tertiary education (Allen & Robbins, 2010, 2007; Tracey, Allen, & Robbins, 2012; Wong, 2006). A preliminary survey conducted by the Department of Polytechnics Education (2012) found that majority of the hearing-impaired students failed to learn effectively. Despite having minimum entry qualifications, the absence of a good academic major selection system was also identified as among the leading factors which contributed to the learning inefficiency (Department of Polytechnics Education, 2012). This scenario contradicted the literature reviews which indicated that incongruence between the students' personality types and their academic major would lead to students' dissatisfaction; which in turn affect their academic achievement (Holland, 1997). Ideally, students would be enjoying better academic achievement as their satisfaction and adjustment towards learning environment increased.

Based on the studies in the person-environment fit (P-E Fit) context, it is not deniable that congruence or fit between the students' personality types and their academic majors (henceforth, personality-major [P-M Fit]) would lead to positive impact in academic achievement (Norida, Ahmad Rozelan, & Hafzan, 2006). However, relatively little emphasis has been given in the P-E Fit context involving the hearing-impaired students in Malaysian tertiary education, particularly of those enrolling in Polytechnics Special Skills Certificate (Samsilah, Che Rozaniza, Maria Chong, & Soaib, 2015). In addition, to date, literature reviews suggested that little focus has been given on the other aspects of P-E Fit such as demands-abilities fit (D-A Fit) and needs-supplies fit (D-A Fit) perception particularly in Malaysian tertiary education context. Thus, there is an urgent need to explore the role of P-E Fit in enhancing the hearing-impaired students' academic achievement as the implications are directly related to their rights in gaining access and equity in tertiary education. In addressing the theoretical gaps, this present study focuses on three aspects of P-E Fit (namely P-M Fit, D-A Fit and N-A Fit) towards enhancing the hearing-impaired students' academic achievement in tertiary education.

Hence, this proposed framework consists of three main predictors of P-E Fit by integrating the Holland's Typology Theory (1997) and the Work Adjustment Theory (1984). The proposed predictors served as hypothetical basis of hearing-impaired students' academic achievement. In addition, this article also explores the role of hearing-impaired students' adjustment and satisfaction towards enhancing their academic achievement. In order to understand how P-E Fit, adjustment and satisfaction could be incorporated into a single model in predicting hearing-impaired students' academic achievement; an empirical investigation is strongly suggested to explain associations between all the mentioned factors.

This review paper shall begin with exploring the conceptual and theoretical definition of P-E Fit in terms of Holland's Typology Theory (1997) and the Work Adjustment Theory (1984) as well as the outcomes of P-E Fit. Next section discusses the predictors of hearing-impaired students' academic achievement in terms of P-M Fit, D-A Fit and N-A Fit, adjustment and satisfaction. Finally, a theoretical framework is developed based on the formulated hypotheses in predicting the associations between the key factors.

Definition of P-E Fit and Outcomes

P-E Fit generally refers to the interaction between an individual (person) and their social settings or environment (Li, Yao, Chen, & Wang, 2012). In accordance to Holland's Typology Theory (Holland, 1997), there are six categories of individual's personality type and his or her environment. These personality and environment consist of Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E), and Conventional (C) types. It is theorized that the congruence, match, similarity or fit between a person personality type and his environment would lead to better occupational (Swaney, Allen, Casillas, Hanson, & Robbins, 2012) and academic outcomes (Guan, Ma, Liu & Ju, 2006; Li et al., 2012; Nauta, 2007; Smart, Feldman, & Ethington, 2000; Tracey et al., 2012).

P-E Fit has been extensively studied in various environments such as organizations, groups, individuals or vocations (Holland, 1997). In educational contexts, environment could either be represented by institutional environments (e.g., Westernman & Vanka, 2005) or academic majors (e.g., Samsilah et al., 2015; Tracey & Robbins, 2006; Wessel, Ryan, & Oswald, 2008). Since academic major is considered as a more immediate environment to students' daily contacts and activities, this review paper explores the impact of P-M Fit in enhancing hearing-impaired students' outcomes by implementing the Holland's Typology Theory (1997).

As previously discussed, in terms of predicting students' outcome at tertiary education level, other aspects of P-E fit such as D-A Fit and N-S Fit perceptions would also be incorporated into the proposed framework. In other words, P-E Fit in this present study is rather viewed as an umbrella term which consists of 3 underlying factors; namely P-M Fit, D-A Fit and N-A Fit perception.

Based on the Work Adjustment Theory (1984), D-A Fit refers to the person abilities and the demands from the environment (Dawis & Lofquist, 1984). On the other hand, N-S Fit generally refers to the needs of the person and the rewards received from

the environment (Dawis & Lofquist, 1984). N-S Fit in educational setting refers to the congruence or fit between the students' needs and the rewards they received in returns of their study (Li et al., 2012).

Hearing-impaired students have special educational needs that require certain accommodations from the environment in order to satisfy their needs. These accommodations include the use of sign language by the lecturers or sign language interpreter, lecture notes, computer-based visual aid, campus facilities and note-taking services (Allen-Powell, 2011; Antia, Jones, Reed, & Kreimeyer, 2009; Department of Polytechnic Education, 2012; Braswell-Burris, 2010; Christen, Lori, Cheryl, & Nicholas, 2013; Clark, 2007; Lang, 2002; Powell, Hyde, & Punch, 2014; Susan et al., 2008).

Based on the above discussions, individual characteristics in this present research refers to students' personality types, abilities and needs while environment refers to their academic majors, demands and rewards they received from the environment. To conclude, the integration of P-M Fit, D-A Fit and N-A Fit perceptions under a larger definition of P-E Fit would readdress the gaps currently present in the hearing-impaired students' population in Malaysian tertiary education context.

Predictors of Hearing-Impaired Academic Achievement

In the previous section, authors have concluded that the predictors of hearing-impaired students' academic achievement could be categorized into three factors of P-E Fit (i.e P-M Fit, D-A Fit and N-S Fit), adjustment and satisfaction. In order to strengthen the proposed developed framework, this entire section gives more emphasis on each of the individual factors relating to hearing-impaired students' academic achievement. Formulated hypotheses are also suggested to predict associations between the key factors.

Relationship between P-M Fit and Outcomes

Congruence or fit in academic environment could be referred as the match between students' personality types and their academic major (Holland, 1997). P-M Fit serves as among the main criteria which positively affect students' academic major selection and academic achievement particularly at tertiary education level (Tracey et al., 2012; Tracey & Robbins, 2006; Tracey, 2010; Wong, 2006). Tracey and Robbins (2006) conducted a five year longitudinal study to investigate the relationship between P-M Fit and students GPA by following 80,574 students in 87 colleges. The findings indicated that students' overall GPAs predicted P-M Fit much better than ACT scores.

On the other hand, P-M unfit or the mismatched between students' personality types and their environment would affects students ability to earn better academic grades (GPAs), lack of persistence, satisfaction and experience less future career success (Logue, Lounsbury, Gupta, & Leong, 2007; Porter & Umbach, 2006). Students would find themselves studying topics that do not match their interests, skills and values, and belong to faculty or course mates who do not pose the common attributes (Jones & Jones, 2012). Though graduated, students with P-M unfit would be less likely to achieve overall satisfaction and success in their future career (Smart et al., 2000). Smart et al. (2000) found that students' abilities in matching the academic major to their own personality types were positively related to increase in satisfaction and academic achievement.

With regards to hearing-impaired students' population, Stinson & Walter (1992) stated that changes in career interests served as among the underlying reasons which explained students' failure in tertiary education completion. Scherer and Walter (as cited in Lang, 2002) also reported that hearing-impaired students were unable to decide their own academic major. As result, these 320 hearing-impaired students withdrew from their study or transferred to another academic major (Lang, 2002). These findings explained how students' dissatisfaction may occur which in turn affect their academic achievement in tertiary education.

Based on the above discussions, P-M Fit literatures have documented sufficient and significant evidences on the role of P-M Fit in enhancing hearing students' educational outcomes at tertiary level education as compared to hearing-impaired population. Thus, by adapting the P-M Fit framework to suit the hearing-impaired students' population, we predict that:

H₁: P-M Fit has significant relationship with hearing-impaired students' satisfaction and academic achievement.

Relationship between D-A Fit and Outcomes

Each environment consisted of specific demands which is directly associated to individual abilities and have positive influences on students satisfaction and academic achievement (Brown, 2007; Cable & DeRue, 2002; Li et al., 2012). The Theory of Work Adjustment by Lofquist and Dawis (1984) served as the main theoretical foundation which relates the match or correspondence between the individual's abilities in meeting the demands from the environment.

The Theory of Work Adjustment (1984) provides greater understanding in exploration of correspondence between individual and environment. D-A Fit is considered as critical complementary fit perceptions to P-M Fit under a broader definition of P-E Fit (Li et al., 2012). D-A Fit has been studied in various context including occupational and educational context (Cable & Derue, 2002; Choi, 2004; Li et al., 2012; Piasentin & Chapman, 2006). Findings indicated that D-A Fit has significant relationship on satisfaction (Choi, 2004; Livingstone, Nelson, & Barr, 1997) and academic achievement (Li et al., 2012; Piasentin & Chapman, 2006).

According to Edwards, Caplan & Harrison (1998) demands consisted of task requirements, role expectations, and institutional norms while abilities consisted of such as aptitudes, time, and energy an individual requires in meeting of the environment. In

educational context, Li et al. (2012) stated that academic achievement would be evidenced if students learning abilities meet the demands of their coursework. Therefore, D-A Fit are considered as the best predictor of academic achievement (Li et al., 2012).

Despite academic achievement, literature reviews have suggested that D-A Fit also predicted satisfaction in various physical environments (as discussed above). Thus, we would also like to suggest the role of D-A Fit in predicting hearing-impaired students' satisfaction. We believed that once satisfaction is achieved, students' academic achievement would also increase. Stinson and Walter (1997) suggested that hearing-impaired students' enrolment in tertiary education should also consider the D-A Fit aspects. Therefore, we predict that:

H_{a2}: D-A Fit has significant relationship with hearing-impaired student satisfaction and academic achievement.

Relationship between N-S Fit and Outcomes

Similar to D-A Fit, N-S Fit is also explained by The Theory of Work Adjustment (Lofquist dan Dawis, 1984) which relates to the match or correspondence between the individual's needs and desires in gaining rewards (supplies) from the environment (Lofquist & Dawis, 1984). According to Edwards et al. (1998), needs include person innate biological and psychological requirements; whereas supplies refer to extrinsic and intrinsic resources and rewards that fulfill the individual needs. In educational settings, Li et al. (2012) stated that students diverse needs requires fulfillment by their educational environment.

According to the Theory of Work Adjustment (1984), when individual needs and desires were fulfilled by the related tasks, job satisfaction would be experienced (Dawis & Lofquist, 1984). Therefore, in spite of predicting job satisfaction (Cable & Derue, 2002), N-S Fit is also considered as predictor of academic satisfaction (Lee, Reiche, & Song, 2010; Li et al., 2012; Wessel, Ryan, & Oswald, 2008). Li et al. (2012) have found a positive correlation between N-A Fit and academic achievement ($r = .22$, $r < .01$). Therefore, we predict that:

H_{a3}: N-S Fit has significant relationship with hearing-impaired student satisfaction and academic achievement.

Relationship between Student Adjustment, Satisfaction and Academic Achievement in the P-E Fit Framework

Adjustment refers to individual's adaptation process in an environment by overcoming stressors triggered by the demands of the environment. In terms of adjustment problems, studies indicated that hearing-impaired students have difficulties in adjusting to social, emotional and academic aspects (Allen-Powell, 2011; Bala & Rao, 2007; Brouzos, Misailidi, & Hadjimattheou, 2014; Hallahan, D. P., Kauffman, J. M., & Pullen, 2015; Qi & Mitchell, 2012). Thus, with respect to academic achievement, hearing-impaired students are expected to be socially, emotionally and academically adjusted in meeting the demands of their educational environment.

Student adjustment is regarded as among the predictors of student academic achievement (Baker & Siryk, 1984; Maria Chong Abdullah, 2008; Wintre & Bowers, 2007). On top of that, adjustment is also predicted by individual's personality trait (Weiten, Lyod, Dunn & Hammer, 2009; Wessel et al., 2008). Since the P-M Fit perception consists of RIASEC personality traits based on Holland Typology Theory (1997), we predict that:

H_{a4}: P-M Fit has significant relationship with student adjustment.

In response to P-M Fit, we hypothesized that hearing-impaired students would undergo overall adjustment in the event of P-M mismatched. This statement refers to Wessel et al. (2008) who claimed that students with lower P-M Fit but with high level of adjustment would experience higher satisfaction as compared to those with lower adjustment. Though we hardly find literature supports in explaining the association between the other two aspects of P-E Fit and students' adjustment, we would like to extend our exploration to D-A Fit and N-S Fit in explaining students' adjustment.

We believed that D-A and N-S mismatched would also serve as environmental stressors that may affect students' academic achievement. Thus, hearing-impaired students would undergo overall adjustment to overcome environmental stressors resulted from the mismatched between their personal (abilities and needs) and environmental (demands and supplies) factors. Once overall adjustment is achieved, satisfaction and academic achievement would also be increased. In addition, student satisfaction is also related to their academic achievement (Graunke & Woosley, 2005; Guan et al., 2006). Hence, we extend our predictions to test the following hypotheses:

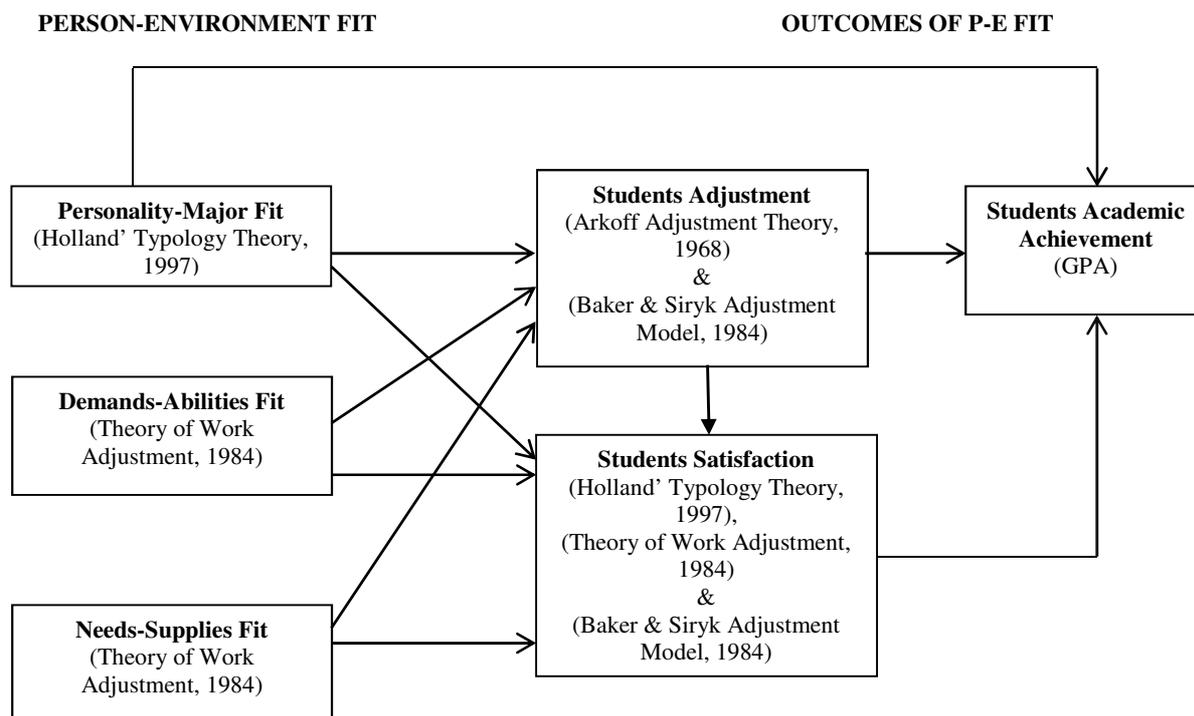
H_{a5}: D-A Fit has significant relationship with students' adjustment.

H_{a6}: N-S Fit has significant relationship with students' adjustment.

H_{a7}: Student adjustment has significant relationship with student satisfaction and academic achievement.

H_{a8}: Student satisfaction has significant relationship with academic achievement.

Figure 1: Theoretical Framework for Exploring P-E Fit towards Enhancing Hearing-Impaired Students' Academic Achievement in Tertiary Education



Conclusion and Implications for Educational Theory and Practice

This review article aimed to develop a theoretical framework for predicting hearing-impaired students' academic achievement at tertiary education level. The integration of Holland's Typology Theory (1997) and the Work Adjustment Theory (1984) underlies the proposed theoretical framework. This proposed theoretical framework which consists of three main predictors of P-E Fit (i.e P-M Fit, D-A Fit and N-S Fit), adjustment (i.e academic, social and emotional aspects) and satisfaction would potentially predict hearing-impaired students' academic achievement in Malaysian Polytechnics.

The basic principle of this integrated framework lies in the interaction between hearing-impaired students personal (i.e personality, abilities and needs) and their environmental factors (academic major, demands and supplies), with emphasis on educational outcomes (i.e adjustment, satisfaction and academic achievement). This framework suggested that hearing-impaired students with higher levels of P-M Fit, D-A Fit and N-S Fit perception would be enjoying better academic achievement as they are more satisfied and well-adjusted to their learning environment. Ideally, P-M Fit, D-A Fit and N-S Fit would allow the hearing-impaired students to understand the demands and supplies of their academic major with regards to their personality types, abilities and needs. The information provided by these three P-E Fit aspects would encourage students to undergo several adjustment processes in meeting the demands and supplies of their academic major particularly in the event of P-E unfit. As result, hearing-impaired students would be more satisfied with their study and motivated towards earning better grades (GPA); which in turn increase the chances of institutional graduation rates.

In addition, the establishment of specialized academic major selection system is also expected in addressing the issues of P-M mismatched. The establishment of academic major selection system would allow the hearing-impaired students to choose their own academic major scientifically and systematically; thus have greater chance to enhance their academic outcomes. The use of sign language interpreter (for all the subjects), note taking assistance, modified instructions and the implementation of Individualized Education Plan (IEP) may also be applied as additional approaches to existing classroom accommodation readily practised by the lecturers. The implementation of these approaches may help to increase the level of N-S Fit and D-A Fit perceptions among the hearing-impaired students.

Despite major contributions in the hearing-impaired tertiary education context, the present study is subjected to several limitations. First, the theoretical framework of this study is developed based on quantitative approach to study the impact of P-E Fit towards enhancing hearing-impaired students' academic achievement in Malaysian Polytechnics. Except for academic achievement, the rest of the outcomes are based on self-reports. Thus, students' responses are limited to only theoretically pre-developed questionnaire items. Second, P-E Fit is only examined at one time point. Ideally, a longitudinal study could be implemented for future research as P-E Fit is not static but the process unfolds over time (Schmitt et al., 2008). In addition, the generalization of this study is only limited to hearing-impaired students undergoing Special Skills Certificate in Malaysian Polytechnics. Thus, the results could not be represented to the other hearing-impaired students' population such as those studying in the universities, community colleges and private colleges.

However, in certain degree this study contributes into the understanding of how P-E Fit framework could be implemented to enhance the hearing-impaired students' academic achievement in tertiary education. Educational authorities via the Department of Polytechnic Education may provide necessary interventions in helping the hearing-impaired students to understand their own personality types, abilities and needs in overcoming any related issues related to academic major mismatched, meeting the programme's demands and supplies, overcoming adjustment problems and dissatisfaction towards their learning environment. Effective academic supervision, counsellor's training and coaching may also be implemented to provide effective career planning in suiting the hearing-impaired students' educational needs. Finally, better understanding towards dealing with hearing-impaired students' diversity throughout their length of study would lead to better academic provision that could enhance their overall P-E Fit perceptions, adjustment, satisfaction and academic achievement.

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