International Journal of Agricultural Management and Development
Available online on: www.ijamad.iaurasht.ac.ir
ISSN: 2159-5852 (Print)
ISSN:2159-5860 (Online)
Research Paper

Faculty Members' Development in Agricultural Higher Education: Does the University Size Matter?

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Received: 11 July 2018,
Accepted: 19 April 2019

Abstract

Higher education has recently faced new challenges and responsibilities such as higher expectations to contribute to national and regional developments, considerable cuts in public funds, and the highly competitive educational markets. The main purpose of this study was to investigate faculty members' development components in agricultural higher education in Iran. Specifically, it aimed to explore the differences among faculties of agriculture on the components of their faculty members' development and analyzed academics' perceptions toward the current and desirable status of their development. Furthermore, this research examined the faculty members' perceptions of the most influential component of their development. The population was 1837 faculty members and 280 of them were selected using the stratified random sampling method. The results showed that the faculty members perceived their individual development as higher than and equal to average. There was also a significant difference between universities on the components of their faculty members' development based on their size except for their individual development. The analysis also suggested wide gaps between the status quo and desirable situations of each component of development as perceived by the faculty members. Furthermore, the faculty members perceived their professional development as the most influential component of their development. Recommendations are made to improve faculty members' development in agricultural higher education particularly in Iran.

Keywords:
Agricultural Higher Education;
Faculty Development;
Faculty Members;
Professional development

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INTRODUCTION

Higher education plays important roles in fostering economic and particularly human capital development of different nations (Adedeji & Campbell, 2013). Higher education has recently faced with various challenges (Altbach & Davis, 1999) and responsibilities all over the world including higher expectations to contribute to social and economic developments at both national and regional levels (Altbach & Davis, 1999; Shin & Harman, 2009), deal with the increasing number of students and their demographic changes (Altbach & Davis, 1999) and cope with the cuts in public funds (Scott, 2000) and the highly competitive educational markets (Dill, 1997). Institutions of higher education have also been struggling with higher demands for accountability (Altbach & Davis, 1999), expansion, diversification, massification (Shin & Harman, 2009; Sporn, 1999) and globalization (Scott, 2000).

Previous research has found a positive relationship between the development of human capital in higher education institutions and their capacity to face these challenges and successfully fulfill their new responsibilities (Deem et al., 2008; Volkwein & Tandberg, 2008). Yet, there are few empirical studies on the faculty members' development at universities (Akbari, 2012). This lack of research is more serious on the components of faculty members' development (Sadeghi et al., 2010) and particularly at the faculties of agriculture. However, agricultural higher education creates the majority of human resources required in the agriculture sector (FAO, 1997). Particularly in Iran, the agriculture and natural resources sector provides 12 percent of GDP, 22 percent of employment, and 15 percent of non-oil exports and supplies 90 percent of the raw materials in the food industry and highly contributes to the national economy development (Ministry of Agriculture, 2008).

Despite these critical influences, little empirical research focused on the faculty members' development at universities (Akbari, 2012). While the competencies of agriculture faculty members highly influence different aspects of agricultural higher education system including students' capabilities, achievements and success as well as educational content and environment (Abbasi & Hejazi, 2010), there is little empirical evidence on the components of the faculty members' development in agricultural higher education in Iran. In response, this study set out to examine the components of academics' development at the faculties of agriculture. More specifically, it analyzed the perceptions of faculty members towards the most influential component of their development based on the size of the universities. This study also investigated the faculty members' perceived gaps between the current and desired status and the most influential component of their development. This paper is organized in the following sections. First, we describe the faculty members' development in Iran's higher education system. Second, we review the literature on faculty members' development. Third, we present the research methodology and findings. Finally, we discuss the findings and conclude with implications of the findings for policymaking, research and practice.

Faculty members' development in Iranian higher education system

Iranian Higher Education System has been highly growing during the last few decades. Hamdhaidari et al. (2008) have investigated and compared the development of the higher education system in Iran before and after the Islamic revolution. Based on their results, diversification and expansion of universities, enhancing research, widening access, the use of a wide range of information and communication technology, decentralization and gender equity were some of the changes in higher education after the revolution. Public institutions of higher education are supported primarily by the government funds. The two main ministries responsible for higher education are the Ministry of Science, Research and Technology (MSRT) and the

Ministry of Health and Medical Education (MHME). Furthermore, the Ministry of Education (ME) collaborates with the Ministry of Agriculture (MA) in the provision of some higher education agriculture programs (Abbasi & Zamani-Miandashti, 2013). In 2012, almost 2,470 universities and institutes of higher education have employed over 66,314 faculty members (Abbasi & Zamani-Miandashti, 2013). Regarding agriculture education, there are 41 public agricultural faculties, affiliated with Iran's MSRT, offering more than 16 undergraduate and graduate programs. A total number of 2,030 faculty members are teaching and doing research in different areas of agriculture and natural resources (Abbasi, 2010). Systematic activities of human resource development in agriculture in developing countries have been less effective, and on the other hand, there is little information if such activities are successful (Zamani-Miandashti & Malek-Mohammadi, 2012). Along with the increasing number of faculty members, policymakers in the higher education system paid much attention to their development in various personal, professional, educational, social and organizational dimensions and also included their development in the strategic plans of the country such as Iran's 20-year vision and the five-years development programs, but in practice, the results showed that higher education policies regarding faculty development were not effective in development programs.

In recent years, faculty development has attracted more attention in Iran and human capital indexes have increasingly improved. According to the World Economic Foundation report for 2015 and compared with 2013, Iran's human capital indexes are growing. In 2015, Iran ranked 80th in the World Economic Forum's analysis of the human capital indexes among 124 countries (World Economic Foundation, 2015). Following what was mentioned and supported by knowledge-based companies which are established by the faculty members, inter and between university collaborations, attempts to internationalize universities, more attentions have been paid to faculty members' welfare services, support academics to participate in the national and international seminars and conferences, and provide them with different in-service training courses, to name some of the programs developed for faculty members' development in Iran.

Literature review and theoretical framework

Faculty development, as we understand it today, began to cope with the social and economic turbulences of the late 1950s and 1960s (Bergquist, 1992; Ouellett, 2010; Sorcinelli & Austin, 2006). Faculty development refers to the broad range of activities that institutions of higher education adopt to renew and assist faculties in their multiple roles (Centra 1978). Faculty development is one of the mechanisms to improve the instructional competencies of teachers (Wilkerson & Irby, 1998). Nelson (1983) defined faculty development as a process that is "*designed to improve faculty performance in all aspects of their professional lives*" (p.70). Different universities and higher education institutes have defined faculty development as developing competencies and skills of faculty members to improve their academic performance.

In spite of its broad applications, no precise and all agreed definition is proposed for the notion (Bland et al., 1990; Boyce et al., 2009; Justice, 1979; Wilkerson & Irby, 1998). In the literature, the concept of faculty development is applied in different areas such as educational /instructional development (Bregquist & Phillips, 1975; Riegle, 1987), professional development (Riegle, 1987), academic/personal development (Bregquist & Phillips, 1975; Riegle, 1987; Millis, 1994), staff development (Steinert, 2014) and organizational development (Akbari, 2012; Akbari et al., 2016; Akbari et al., 2014; Bregquist & Phillips, 1975; Riegle, 1987). This indicates the concept of faculty development is at the early stage of evolution and expansion (Hitchcock et al. 1992).

Research has suggested different definitions for faculty development (Bland et al., 1990; Boyce et al., 2009; Justice, 1979; Wilkerson &Irby, 1998). A broad range of studies has been undertaken to explore the complexities of effective professional development for teachers. These studies illustrate factors that need to be carefully considered when determining appropriate delivery methods, standards and/or approaches to assess professional learning (Berliner, 2005; Elmore, 2004; Fullan, 2005; Lieberman & Wilkins, 2006; Tomlinson, 2005).

Siegel (1980) suggested a model for faculty development that contains professional, instructional, curricular, and organizational development. Boyce et al. (2009) showed that institution characteristics (i.e., culture, structure, roles and responsibilities), student-related activities, teaching abilities, scholarship and research abilities, practice abilities and the practice site, and professional abilities (leadership, career planning, balancing responsibilities, etc.) were essential components of a faculty development program for pharmacy faculties. They also suggested that a comprehensive faculty development program facilitates growth throughout a faculty member's career path. The structure of such a program includes an orientation program to provide an overview of responsibilities and abilities, a mentoring program to provide one-to-one guidance from a mentor, and a sustained faculty development program to provide targeted development based on individual and career needs (Boyce et al. 2009). In Berquist and Philips's (1975) study, faculty members' effective development is a process of interactions between three organizational, educational and individual dimensions (Hosseini, 1991). Successful development needs comprehensive efforts of teachers and administrators to plan, implement, and follow-up for the development. It should promote collegial interactions and provide ongoing opportunities for professionals to share perspectives and seek solutions to common problems (Guskey, 1995).

Birman et al. (2000) showed that professional development should focus on deepening the content of teachers' knowledge and their understanding of how students learn a particular content, providing opportunities for their active learning, and encouraging coherence in their professional development experiences. Schools and districts should pursue these goals by using long-term activities and involving collective participation. Although new forms of professional development are more effective than traditional ones, the advantages to reform activities are explained primarily by the greater duration of the activities.

Specifically, in Iran, Hejazi and Rostami (2010) showed that intuitional, management, personal and social factors highly influence faculty members' development. Sadeghi (2008) developed several strategies for academics' development in agricultural faculties. The findings of this research highlighted the current strategies, inter-university, between-universities, evaluative, supportive, and e-learning strategies as the most important strategies for agriculture academics' development. In another study, Sadeghi et al. (2010) identified psychological, management, social, intuitional and supportive factors as the effective components for the professional development of faculty members in agriculture faculties. Several institutions of higher education have implemented a variety of faculty development programs aimed at helping the faculty design and teaching online courses, and more effectively using technologies in the traditional classrooms (Meyer & Murrell, 2014).

To date, several studies have examined the faculty development activities (Amornpipat & McLean, 2014; Boyce et al., 2009; Burks et al., 2009; Davis et al., 2015; Guevara et al., 2013; Lee et al., 2010; Steinert et al., 2006; Steinert & Mann, 2006; Wadhwa et al., 2014; Williams et al., 2015). Based on the literature, the components of a comprehensive faculty development program include individual development (ID), social development (SD),

professional development (PD), organizational development (OD) and educational development (ED) (Table 1). As Table 1 shows, most of the researchers have suggested organizational development as one of the dimensions of faculty members' development followed by educational, individual, social and professional developments.

Table1

Faculty Member's Development Components in Different Researches

Components	Siegel, 1980	Bergquist and Phillips (1978); cited in Hosseini (1991)	Grieves and Redman (1999)	Toombs (1975)	Mankin (2001)	Tjepkema et al. (2002)	Iles and Yolles (2003)	Steinert and Mann Karen (2006)	Ahmady (2009)	Sadeghi et al. (2010)	Hejazi and Rostami (2010)
individual development		*								*	*
social development										*	*
professional development	*			*							
organizational development	*	*	*		*	*	*	*		*	*
educational development	*	*		*					*		

METHODOLOGY

This study employed a quantitative research method to investigate the components of faculty members' development in nine public agricultural faculties in Iran. Focusing on public faculties was because agricultural faculties are dominantly public in Iran. The population included all the faculty members of public agricultural faculties (N=1,837) in Iran. About 350 questionnaires distributed among faculty members. A sample of 280 faculty members was selected using Krejcie and Morgan's (1970) sampling table and the stratified random sampling method with the proportional allocation (response rate of 80 percent). The selection of this method of sampling was based on the stratification system developed by the MSRT. According to the stratification system, all the 31 provinces of Iran (and universities located in the provinces) are classified into five categories based on their geographical locations (North, South, East, West, and Center). The faculties of agriculture in each category were divided into three groups based on the number of their faculty members (large, medium and small). The agricultural faculties with less than 50 faculty members were categorized as small, those having between 50 and 70 faculty members as medium and those with higher than 70 faculty members as a large faculty (Gholifar et al., 2012). The selected faculties included three small, two medium and four large faculties. The sample was randomly selected from each category using the proportional sampling method. From the small category, agricultural faculties in Kermanshah (n=31), Lorestan (n=20) and Kohgiluyeh and Boyer-Ahmad (n=34) provinces were involved in this study. Agricultural faculties in Zanjan (n=30) and Sistan and Baluchestan (n=25) provinces were the medium-sized faculties included in this research. Finally, agricultural faculties in Kerman (n=15), Fars (n=32), Golestan (n=43) and Isfahan (n=50) provinces were the large agricultural faculties (Table 2). Of the faculty members involved in this study, 91 percent

were men and 9 percent were women. The majority of them (93%) were married and 7 percent were single. The average age of the respondents was 41.6 years (SD=8.18), 11 percent were an instructor, 68 percent was an assistant professor, 16 percent was an associate professor, and 5 percent were a full professor. About 66 percent of the faculty members were graduated from a national university in Iran, while others obtained their degree from an international university.

Table 2
Sample Size

University type	Name	Sample
Small	Kermanshah, Lorestan, Kohgiluyeh and Boyer-Ahmad	312034
Medium	ZanjanSistan and Baluchestan	3025
Big	Kerman, Golestan, Fars, Isfahan	15153250

Based on the literature, a questionnaire was designed to assess the components of faculty members' development. The questionnaire included individual development (ID), 7 items (e.g., personal capabilities); social development (SD), 10 items (e.g., participation in social and teamwork activities); professional development (PD), 9 items (e.g., participation in seminars, conferences, and sabbatical leaves); organizational development (OD), 14 items (e.g., continues evaluation and establishing HRD center and development of infrastructures); and educational development (ED), 9 items (e.g., continues education and learning from experienced teachers). All items were measured using a 5-point Likert scale ranging from 1 = very low to 5 = very high. The participants were asked to indicate their degree of agreement on two dimensions: "how it is", indicating the perception of the respondents toward the status of the agricultural academics' development, and "how it should be", that is the desired status of the development component based on the participants' perceptions. The content validity of the questionnaire was confirmed by seven faculty members with at least five years of experience in the agricultural faculties. The questionnaire was revised based on their comments. A confirmatory factor analysis (CFA) was performed to investigate if the components of faculty members' development had acceptable loadings to the construct. The results indicated that the majority of the components highly loaded to the construct of faculty members' development (ID between 0.60 and 0.784; SD between 0.56 and 0.80; PD between 0.43 and 0.70; OD between 0.48 and 0.71; ED between 0.47 and 0.70).

The convergent validity of the constructs was measured using the average variance extracted (AVE), which should exceed 0.50 (Fornel & Larcker, 1981). All factor loadings for the indicators were higher than the threshold of 0.50. AVEs for the constructs ranged from 0.91 to 0.94. In order to assess the internal consistency reliability, Cronbach's alpha coefficient was used. The Cronbach's alpha for all items on faculty members' development indicated the high internal reliability of the instrument (α=0.965) and the components of the faculty members' development (ID=0.80, SD=0.80, PD=0.81, OD=0.84, ED=0.89). Furthermore, the composite reliability (C.R) for all of the components of faculty members' development was

higher than the 0.7 threshold (Fornel & Larcker, 1981) indicating strong reliability of faculty development components (ID=0.96, SD=0.96, PD=0.97, OD=0.98, ED=0.97).

RESULTS

Faculty members' level of development

In order to identify the degree of the faculty members' development, three categories were established. Overall, the results showed that in small agricultural faculties the ID dimension was at the medium followed by the big and medium-sized faculties. While in SD dimension were small, medium and big-sized faculties, respectively. In PD and OD dimensions the order of the faculties was the big, medium and small-sized faculties, respectively. While in ED, medium-sized faculties were in the top followed by the big and small faculties (Table 3).

Components of the faculty members' development based on their faculties

The third research question investigated whether there were significant differences in the faculty members' perceptions towards the five components of their development in different universities (small, medium and big). The Kruskal-Wallis test was used to answer this question. Table 4 shows there were significant differences at 0.05 level among social development, professional development, and educational development components of the faculty members' development.

Differences between the current and desirable status of faculty development

The next research question was to determine whether there were significant differences in the faculty members' perceptions toward the current and desired status of the five faculty members' development components. A Wilcoxon test was used to answer this question. Table 5 shows that there were significant differences at the 0.001 level between the status quo and desirable situations of each component of development as perceived by the faculty members. This means there is a wide gap between the current and desired status of academics' development in all components and they expect higher from their development programs.

Table 3

Means and Standard Deviations for the Components in Universities

Components	Type of universities by size	Mean	SD	Low		Medium		High	
				f	Percent	f	Percent	f	percent
ID	Small	24.4	4.64	13	15.3	59	69.4	13	15.3
	Medium	23	5.7	13	25.0	28	53.8	11	21.2
	Big	22.7	5.3	48	33.8	77	54.2	17	12.0
SD	Small	28.13	7.07	25	29.4	54	63.5	6	7.1
	Medium	29.5	7.12	18	32.7	29	52.7	8	14.5
	Big	26.8	6.4	59	41.3	74	51.7	10	7.0
PD	Small	24.7	6.99	17	20.0	52	61.2	16	18.8
	Medium	27.3	6.27	3	5.5	35	63.6	17	30.9
	Big	24.3	5.99	26	18.1	101	70.1	17	11.8
OD	Small	37.6	9.78	24	28.2	48	56.5	13	15.3
	Medium	41.3	9	8	14.5	34	61.8	13	23.6
	Big	37.5	8.8	37	26.2	90	63.8	14	9.9
ED	Small	24.2	6.8	21	24.7	47	55.3	17	20.0
	Medium	26.5	6.6	8	14.5	34	61.8	13	23.6
	Big	26.5	6.16	35	24.3	83	57.6	26	18.1

Table 4
A Comparative Analysis among Universities (Perceptions of the Faculty Members)

Components	Mean rank			Chi-square	*p*-value
	Small universities	Medium universities	Big universities		
ID	148.22	133.96	123.26	5.208	0.074^{ns}
SD	131.29	143.36	115.36	5.987	0.050
PD	126.24	154.41	121.93	7.424	0.024
OD	114.49	141.79	114.76	5.820	0.054^{ns}
ED	132.43	158.47	125.46	7.064	0.029

*: p <0.05; **: p <0.01

Table 5
Means Comparison for Component of Faculty Members Development

	Mean Rank		Z	*p*-value
	Negative	Positive		
ID	61.02	127.30	-11.776	0.000
SD	35.60	121.48	-12.277	0.000
PD	27.78	126.11	-12.959	0.000
OD	19.23	118.19	-12.619	0.000
ED	25.45	133.19	-13.205	0.000

*: p <0.05; **: p <0.01

Perceived importance of the components of faculty members' development

To examine the perceptions of the faculty members towards the importance of each component of their development, we performed an analytic hierarchy process (AHP). AHP is an organized technique used to identify the relative importance and weight of the components of a construct "through pairwise comparisons and relies on the judgments of experts to derive priority scales" (Saaty, 2008). Inconsistency ratio (IR) for this study was almost 0.1 indicating high reliability of the related importance and weights of the faculty members' components based on common judgments of the experts. The results of the AHP analysis indicated the faculty member has perceived professional development (PD) as the most important component of their development followed by educational, individual, socio-cultural and organizational factors.

DISCUSSION AND CONCLUSION

Professions require continuous updating of knowledge and skills (Sparks & Hirsh, 1997; Somers & Sikorova, 2002) and education is no exception. In addition, the professional development of faculty members is suggested as a crucial component of creating effective schools, promoting the delivery of education and development, and improving learners' performance (Birmanet al., 2000; Rhodes & Houghton-Hill 2000; Wood & Millichamp 2000).

Figure 1. Importance of faculty development components

Therefore, development of faculty members has received growing attention in recent years to enhance the performance of faculty members (Browell, 2000).

This study aimed to examine the components of agriculture faculty members' development in Iran. More specifically, it explored the differences among agriculture faculties on the components based on the size of the faculties and the importance and weights related to the components by the faculty members' development. Overall, the results supported the differences among the faculties in the components of their faculty members' development so that big-sized faculties were in the lowest level in all of the components. While, the components of the faculty members' development in small and medium-sized faculties were in the highest level, except for the ID where small faculties had a higher position than the medium faculties. This emphasizes the impact of faculty size on its faculty members' development and highlights the importance of considering the factor when designing programs and training for faculty members' development. This study also found a significant association between the components of the faculty members' development regardless of their size. That means a change in one component significantly affects other dimensions of the construct. This finding suggests including all of these components in academics' development and training programs and constantly measuring the components in different faculties and providing faculty members with more purposeful and effective professional development. The findings also highlighted ID as the most critical component of the faculty members' development in all of the faculties regardless of their size. Furthermore, this study found the faculty members perceived the status of the components of their development significantly is not what they desired. This result showed the faculty members had significantly higher expectations from their professional development and the status quo does not satisfy their expectations in all of the agricultural faculties. Finally, this study suggested professional development as the most important development component as perceived by the faculty members. This finding highlights the influential importance of professional development in improving the faculty members. This study highly contributes to the few studies on faculty members' development particularly in agricultural faculties (Sadeghi, 2008). It also contributes to the few empirical studies on the components of agricultural faculty members' development. Future studies can compare the components of the faculty members' development in public and private universities. Further research can also examine the components of faculty development in faculties other than agriculture.

ACKNOWLEDGEMENTS

The authors thank all faculty members for their kind cooperation.

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How to cite this article:
Akbari, M., Bagheri, A., & Abbasi, E. (2020). Faculty members' development in agricultural higher education: Does the university size matter? *International Journal of Agricultural Management and Development, 10*(1), 19-31.
URL: http://ijamad.iaurasht.ac.ir/article_670332_78c577d9aa3eb4ce7d91df35225b4aff.pdf