

A Pathological Study of the Curriculum Renewal Process (CRP) Based on Education for Sustainable Development (ESD) Strategic Approach at Shiraz University

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Abstract :

Recently, sustainability has emerged as a core context for 21st Century living, to maintain or improve our quality of life without compromising the ability of future generations to meet their own. This has led to the sustainable development as a basis for overcoming the environmental challenges. The purpose of this research is a pathology study of the curriculum renewal process based on education for the sustainable development strategic approach at Shiraz University for undergraduate courses. The research tools were designed following the Helix model (Desha & Hargroves, 2011) for Rapid Curriculum Renewal. After assessing its validity and reliability, the samples were distributed among the individuals and the final data were analyzed by mean and standard deviations of descriptive statistics method. The statistical population consists of members of the curriculum development council at Shiraz University. Using purposeful sampling method, 54 people were selected as members of the analytical sample. The results showed that in the 'prepare' stage of the curriculum renewal process at Shiraz University, the mean of element 'identify graduate attributes', in the 'explore' stage of the mentioned process, the mean of elements 'identify graduate attributes' and continually monitor and evaluate, in the 'test & pilot' stage of the process, the mean of elements 'identify graduate attributes', 'continually monitor and evaluate' and 'implement program', and in the 'integrate' stage of the process the mean of elements 'identify graduate attributes', 'continually monitor and evaluate' and collaborate Internally and externally, were lower than the standard mean and were considered as some defects.

Keywords: Sustainable Development, Curriculum Renewal Process, Rapid Curriculum Renewal, Education For Sustainable Development.

چکیده:

در سال های اخیر، پایداری به زمینه اصلی برای زندگی قرن بیست و یکم تبدیل شده است، به گونه ای که برای حفظ یا بهبود کیفیت زندگی انسان ها بدون آسیب رساندن به توانایی نسل های آینده این سبک زندگی اجتناب ناپذیر است. توسعه پایدار به عنوان مبنایی برای غلبه بر چالش های محیط زیستی مطرح شده است. هدف این پژوهش، آسیب شناسی فرایند نوسازی مجدد برنامه های درسی دوره کارشناسی بر اساس رویکرد راهبردی آموزش برای توسعه پایدار در دانشگاه شیراز می باشد. بدین منظور با استفاده از مدل مارپیچی (دشا و هارگروو، ۲۰۱۱) در حوزه آموزش برای توسعه پایدار، ابزار تحقیق تهیه شد که پس از سنجش و تأیید روایی و پایایی آن، بین افراد نمونه توزیع شده و داده های حاصله با روش های آماری توصیفی میانگین و انحراف استاندارد تحلیل گردیدند. جامعه آماری شامل اعضای شورای برنامه ریزی درسی دانشگاه شیراز بود. با استفاده از روش نمونه گیری هدفمند، ۵۴ نفر از آنان به عنوان اعضای نمونه آماری انتخاب شدند. نتایج نشان داد که در مرحله آماده سازی فرایند نوسازی مجدد برنامه درسی در دانشگاه شیراز، میانگین بعد شناسایی شایستگی های فارغ التحصیلان، در مرحله اکتشاف فرایند نوسازی مجدد برنامه درسی مذکور، میانگین ابعاد شناسایی شایستگی های فارغ التحصیلان و پایش و توسعه مستمر، در مرحله اجرای آزمایشی فرایند نوسازی مجدد برنامه درسی مورد پژوهش، میانگین ابعاد شناسایی شایستگی های فارغ التحصیلان، پایش و توسعه مستمر و پیاده سازی و در مرحله اجرای سراسری فرایند نوسازی مجدد برنامه درسی مذکور، میانگین ابعاد شایستگی های فارغ التحصیلان، پایش و توسعه مستمر و همکاری های داخلی و خارجی، از میانگین معیار پایین تر بوده و به عنوان آسیب شناخته شدند.

واژه های کلیدی: توسعه پایدار، آموزش برای توسعه پایدار، فرایند نوسازی مجدد برنامه درسی، مدل راهبردی آموزش.

1. INTRODUCTION

Over the last two decades, in particular, sustainability has emerged as a core context for 21st Century living, to maintain or improve our quality of life without compromising the ability of future generations to meet their needs (WCED, 1987). This has led to the evolution of new concepts, including that of sustainable development as a basis for overcoming the environmental challenges (Mebratu, 1998).

Sustainability challenges facing the world demand new approaches to teaching and learning (Selby, 2007). Higher education is responding to these challenges in multiple ways (Rappaport & Creighton, 2007) and higher education institutions play a strategic role in finding solutions to today's leading challenges in the fields of health, science, education, renewable energy, water management, food security and the environment (Erdelen, 2009). Higher education has a vital role to play in shaping the way in which future generations learn to cope with the complexities of sustainable development. Universities and higher education institutions educate highly qualified graduates and responsible citizens able to meet the needs of all sectors of human activity; they provide opportunities for higher learning and for learning throughout life; they advance, create and disseminate knowledge through research and provide, as part of their service to the community, relevant expertise to assist societies in cultural, social and economic development; they contribute to the development and improvement of education at all levels, including through (Khorasgani, 2008).

Ian O'Connor, Vice Chancellor of Griffith University, spoke about this challenge at the Green Cross International 2006 Earth Dialogues forum "Higher education is beginning to recognize the need to reflect the reality that humanity is affecting the environment in ways which are historically unprecedented and which are potentially devastating for both natural ecosystems and us. Like the wider community, higher education understands that urgent actions are needed to address these fundamental problems

and reverse the trends... The urgent challenge for higher education now is to include ecological literacy as a core competency for all graduates, whether they are in law, engineering or business".

Higher education institutes are facing new challenges to improve the quality of education. There is a pressure for restructuring and reforming higher education to provide quality education and bring up graduates who become fruitful members of their societies. Therefore, these institutes are trying to recognize the dimensions of quality education and define strategies to reach their pre-defined standards and goals (Farid et al., 2008). University staffs are being continually challenged, if not harassed, to devote more attention to quality learning outcomes (Lodewijks, 2011).

The curriculum is the essential part of any programs. Mahmodi and Mehr Mohamadi (2012) believe the curriculum is the heart of higher education system and a mirror that shows the successes and failures of the higher educational system. It means that higher education systems for facing the new challenges and responding the social and environmental needs to prepare the curriculum renewal process according to time and circumstances and to adapt curriculum and pedagogical approaches to integrating sustainability in teaching and coursework (Tamura & Uegaki, 2012). Despite successes in incorporating the digital wave of innovation into programs over the last two decades, signals suggest that higher education has been slow to move to integrate sustainability, and is generally poorly prepared to do so (Concoran & Wals, 2008). Also, according to some critical surveys on the state of education for sustainability to review the current level of coverage of topics related to sustainable issues in educational sector programs around world, generally the curriculum renewal process to date has been slow and *ad hoc*, despite clear signs of the imperative for education for sustainability being seen internationally, across government, industry and academia (Desha & Hargroves, 2013).

Hence the challenge for economies around the world is to rapidly achieve a low peaking in emissions, around 2020, to then allow a

more manageable annual reduction target. The challenge of the higher education sector is that the timeframe to achieve peaking does not allow for the required knowledge and skills which are mostly yet to be incorporated into undergraduate programs, to be developed over the standard curriculum renewal timeline, meaning that it will be mostly a postgraduate and professional development challenge. Further, to prepare undergraduates to contribute to society achieving gradual, sustained reductions after the peaking is performed, the standard curriculum renewal process will need to be improved and accelerated (Smith et al., 2007).

In order to mentioned situation that there has been a slow response to deliver education for sustainability, Desha and Hargroves (2009) have presented a model for deliberative and dynamic curriculum renewal that has evolved from their exploration of literature, case studies, pilot trials and a series of workshops with sustainability educators from around the world over the last decade. In fact, they outlined "Helix Curriculum" to achieve "Rapid Curriculum Renewal" where required both the sustainability knowledge and skills to integrate into the curriculum and a timeframe to transition to a state of education for sustainable development. Although the majority of examples that they had drawn were from engineering education, they believe their model could be applied to any discipline or professional field. In fact, having the practical understanding of sustainability is becoming essential competency and urgent requirement for all university graduates.

Despite the role and importance of education in development and backwardness of communities (Chhokar, 2010), Iran still not able to develop appropriate programs, allocation of funds and consequently create the capabilities appropriate in this regard which indicative of weakness in human resource training and then there are deficiencies in the educational system of the country. In a situation that not only progress in the field of science, culture and economy, but also win in the political fields more and more depend on arrangements and operations, mental, intellectual, educational software, in

Iran still focus on development in terms of hardware and there is less attention to the human capitals and their critical assets in the country's development (Yosefi, 2014).

Against this background, the purpose of this research is to answer the research question: "How the Shiraz University curriculum renewal process is compatible with strategic approach of education for sustainable development?"

More specifically, the primary objective of this work is to realize the defects of Shiraz University curriculum renewal process for embedding sustainability into undergraduate programs and to understand deeply on the main reasons why the defects exist.

This study attempts to identify main gaps between the existing curriculum renewal process in Shiraz University and the RCR for the first time. The results of this paper are expected to assist the pedagogues in renewing curriculum according to the strategic approach of CR by awareness of operational limits and context barriers that they would be faced during the process.

2. RESEARCH METHODOLOGY

This research comprised a quantitative research approach, situated in curriculum renewal theory and education for sustainability theory.

The quantitative component entailed application of the survey method to collect participants' views about the process of curriculum renewal for ESD at the Shiraz University. The purpose of the survey method was to recognize and realize the opinions of a large group (54 persons) of Shiraz University's faculty members who are either now curriculum development council's members or were curriculum development council's members about the quality level of acting in the process of curriculum renewal for ESD in the Shiraz University's programs. Hence, the survey method was suitable in this study because opinions of participants were needed to identify areas of strength and weakness about curriculum renewal process at the subject university. The tool used in this research was a researcher-made scale based on the four stages of the curriculum renewal

process with a strategic approach for ESD (Desha and Hargroves, 2011). These tools included the nine sub-scales and 140 items with a six-response option. The test's reliability was measured by item analysis method, and Cornbrash's alpha calculated its validity. According to reliability coefficients (table 1); the test's reliability was approved.

Also, based on the Cornbrash's alpha coefficients (table 1), its validity was accepted. Mean and standard deviations of the descriptive statistics method were used to gain understanding and to compare the opinions of different groups of participants regarding curriculum renewal process at the subject university.

Table 1. Reliability coefficients and Cornbrash's alpha coefficients

| Item | Reliability Coeff. | Cornbrash's alpha Coeff. |
|---------------------------------------|--------------------|--------------------------|
| Curriculum Renewal Strategy | .77 | .94 |
| Identify Graduate Attributes | .74 | .96 |
| Map Learning Pathways | .72 | .92 |
| Audit Learning Outcomes | .50 | .97 |
| Develop and Update Curriculum | .73 | .97 |
| Implement Program | .75 | .93 |
| Raise Awareness and Build Capacity | .78 | .95 |
| Continually Monitor and Evaluate | .65 | .94 |
| Collaborate Internally and Externally | .74 | .96 |

3. RESEARCH MODEL

As mention above, the model which was used in this study was Helix curriculum (Desha and Hargroves, 2011). This model shapes as a 4-stage process that includes nine deliberative and dynamic elements, namely curriculum renewal strategy, identify graduate attributes, map learning pathways, audit learning outcomes, develop and update curriculum, implement the program, raise awareness and build capacity, collaborate internally and externally and continually monitor and evaluate. This strategy is the center of the aim that is to align the implementation of the deliberative and dynamic curriculum model.

4. PARTICIPANT QUESTIONNAIRE

A survey was administered on an individual basis to cross-check own perceptions related to ESD with the data generated during group discussions. A hundred participants completed the questionnaire. The questionnaire asked respondents to indicate quality level of acting of each element in all stages in the process of curriculum renewal in the Shiraz University's programs.

Prepare stage- The following paragraphs are about the data which were obtained from the participants' answers to questionnaire regard to implementing the prepare stage of

curriculum renewal process in Shiraz University based on the strategic approach for ESD.

Table 2 shows the data about the prepare stage as the first stage of curriculum renewal process in Shiraz University for all undergraduate programs and its compatibility with a strategic approach for ESD. According to the data in the table, the mean of this stage (2.23) is lower than the standard mean (2.5), and there is no significant difference between them based on the t-value (1.30) with 53 degrees of freedom. So, the first stage of curriculum renewal process in Shiraz University for all undergraduate programs based on a strategic approach for ESD was evaluated around the standard level.

Table 2. Comparison between the measurements of the prepare stage compatibility of curriculum renewal process at Shiraz University for all undergraduate programs with a strategic approach for ESD.

| | M | SD | SM | T | dt | Sig. |
|---------------|------|------|-----|------|----|------|
| Prepare Stage | 2.23 | 1.62 | 2.5 | 1.30 | 53 | N.S |

Also, table 3 reveals the data evaluation of proportion between the prepare stage's elements in the subject university and the standard model. According to the data, some mean of elements namely, map learning

pathways, audit learning outcomes, develop and update curriculum, implement program, raise awareness and build capacity, collaborate internally and externally and continually monitor and evaluate, were lower than the standard mean and there was no significant difference between them based on the t-values with 53 degrees of freedom. Therefore, these first stage's elements of curriculum renewal process in Shiraz University for all undergraduate programs based on a strategic approach for ESD was evaluated around the standard level. Indeed, the mean of element 'curriculum renewal strategy' (2.59) was higher than the standard mean (2.5), and there was no significant difference between them based on the t-value

(0.47) with 53 degrees of freedom. Therefore, this deliberative element of curriculum renewal process in Shiraz University for all undergraduate programs based on a strategic approach for ESD was evaluated around the standard level. However, the mean of element 'identify graduate attributes' (1.94) was lower than the standard mean (2.5), and there was a significant difference between them based on the t-value (2.52) with 53 degrees of freedom at the significance level (0.01). Therefore, this deliberative element of curriculum renewal process in Shiraz University for all undergraduate programs based on a strategic approach for ESD was evaluated lower than the standard level.

Table 3. Comparison between the measurements of the prepare stage's elements compatibilities of curriculum renewal process at Shiraz University for all undergraduate programs with the strategic approach for ESD

| | M | SD | SM | T | Dt | Sig |
|---------------------------------------|------|------|-----|------|----|-----|
| Curriculum renewal strategy | 2.59 | 1.41 | 2.5 | .47 | 53 | N.S |
| Identify Graduate Attributes | 1.94 | 1.60 | 2.5 | 2.52 | 53 | .01 |
| Map Learning Pathways | 2.21 | 1.50 | 2.5 | 1.40 | 53 | N.S |
| Audit Learning Outcomes | 2.26 | 1.53 | 2.5 | 1.10 | 53 | N.S |
| Develop and Update Curriculum | 2.28 | 1.66 | 2.5 | .94 | 53 | N.S |
| Implement Program | 2.18 | 1.57 | 2.5 | 1.47 | 53 | N.S |
| Raise Awareness and Build Capacity | 2.24 | 1.80 | 2.5 | 1.03 | 53 | N.S |
| Continually Monitor and Evaluate | 2.10 | 1.68 | 2.5 | 1.73 | 53 | N.S |
| Collaborate Internally and Externally | 2.24 | 1.80 | 2.5 | 1.03 | 53 | N.S |

Explore stage

The following paragraphs are about the data which were obtained from the participants' answers to questionnaires regard to implementing the explore stage of curriculum renewal process in Shiraz University based on the strategic approach for ESD.

Table 4 shows the data about the explore stage during the second stage of curriculum renewal process in Shiraz University for all undergraduate programs and its compatibility with a strategic approach for ESD. According to the data in the table, the mean of this stage (2.29) is lower than the standard mean (2.5), and there is no significant difference between them based on the t-value (1.04) with 53 degrees of freedom. So, the second stage of curriculum renewal process in Shiraz University for all undergraduate programs based on a strategic approach for ESD was evaluated around the standard level.

Table 4. Comparison between the measurements explores stage compatibility of curriculum renewal process at Shiraz University for all undergraduate programs with the strategic approach for ESD

| | M | SD | MS | t | dt | Sig. |
|---------------|------|------|-----|------|----|------|
| Explore Stage | 2.29 | 1.35 | 2.5 | 1.04 | 53 | N.S |

Also, table 5 reveals the data evaluation of proportion between the explore stage's elements in the subject university and the standard model. According to the data, then some elements' mean namely, curriculum renewal strategy, audit learning outcomes, develop and update curriculum, implement the program and collaborate internally and externally, were lower than the standard mean and there was no significant difference between them based on the t-values with 53 degrees of freedom. Therefore, these first

stage's elements of curriculum renewal process in Shiraz University for all undergraduate programs based on a strategic approach for ESD was evaluated around the standard level. Indeed, the mean of element „map learning pathways' (2.53) and the mean of raise awareness and build capacity element (2.56) were higher than the standard mean (2.5), and there was no significant difference between them based on the t-values with 53 degrees of freedom. Therefore, these second stage's elements of curriculum renewal process in Shiraz University for all undergraduate programs based on a strategic approach for ESD were evaluated around the standard level. However, the mean of element „ identify graduate attributes' (1.88) and the mean of continually monitor and evaluate

element were lower than the standard mean (2.5) and there was a significant difference between the mean of element „ identify graduate attributes' and the standard mean based on the t-value (2.74) with 53 degrees of freedom at the significance level (0.008). Besides, there was a significant difference between the mean of continually monitor and evaluate element and the standard mean based on the t-value (2.11) with 53 degrees of freedom at the significance level (0.04). Therefore, these second stage's elements of curriculum renewal process in Shiraz University for all undergraduate programs based on a strategic approach for ESD was evaluated lower than the standard level.

Table 5. Comparison between the measurements of the explore stage's elements compatibility of curriculum renewal process at Shiraz University for all undergraduate programs with a strategic approach for ESD

| | M | SD | SM | t | dt | Sig. |
|---------------------------------------|------|------|-----|------|----|------|
| Curriculum renewal strategy | 2.36 | 1.54 | 2.5 | .52 | 53 | N.S |
| Identify graduate attributes | 1.88 | 1.53 | 2.5 | 2.74 | 53 | .008 |
| Map learning pathways | 2.53 | 1.44 | 2.5 | .16 | 53 | N.S |
| Audit learning outcomes | 2.29 | 1.35 | 2.5 | 1.11 | 53 | N.S |
| Develop and update curriculum | 2.37 | 1.48 | 2.5 | .61 | 53 | N.S |
| Implement the program | 2.17 | 1.48 | 2.5 | 1.59 | 53 | N.S |
| Raise awareness and build capacity | 2.56 | 1.49 | 2.5 | .32 | 53 | N.S |
| Collaborate internally and externally | 2.02 | 1.64 | 2.5 | 2.11 | 53 | .04 |
| Continually monitor and evaluate | 2.16 | 1.71 | 2.5 | 1.42 | 53 | N.S |

Test & Pilot Stage

The following paragraphs are about the data which were obtained from the participants' answers to questionnaires regard to implementing the test and pilot stage of curriculum renewal process in Shiraz University based on the strategic approach for ESD.

Table 6 shows the data about the test and pilot stage as the third stage of curriculum renewal process in Shiraz University for all undergraduate programs and its compatibility with a strategic approach for ESD. According to the data in the table, the mean of this stage (2.21) is lower than the standard mean (2.5), and there is no significant difference between them based on the t-value (1.62) with 53 degrees of freedom. So, the third stage of curriculum renewal process in Shiraz University for all undergraduate programs

based on the strategic approach for ESD was evaluated around the standard level.

Table 6. Comparison between the measurements of test & pilot stage's compatibility of the curriculum renewal process at Shiraz University for all undergraduate programs with a strategic approach for ESD.

| | M | SD | SM | t | dt | Sig. |
|----------------------|------|------|-----|------|----|------|
| Test and Pilot Stage | 2.21 | 1.62 | 2.5 | 1.62 | 53 | N.S |

Also, table 7 reveals the data evaluation of proportion between the test and pilot stage's elements in the subject university and the standard model. According to the data, then some elements' mean namely, map learning pathways, audit learning outcomes and collaborate internally and externally, were lower than the standard mean and there was no significant difference between them based

on the t-values with 53 degrees of freedom. Therefore, these third stage's elements of curriculum renewal process in Shiraz University for all undergraduate programs based on a strategic approach for ESD was evaluated around the standard level. Indeed, the mean of developing and update curriculum element (2.68) and the mean of raise awareness and build capacity element (2.60) was higher than the standard mean (2.5), and there was no significant difference between them based on the t-values with 53 degrees of freedom. Therefore, these third stage's elements of curriculum renewal process in Shiraz University for all undergraduate programs based on a strategic approach for ESD were evaluated around the standard

level. However, the mean of curriculum renewal strategy element (2.00), the mean of element „identify graduate attributes' (1.93), the mean of implement the programs element (1.88) and the mean of continually monitor and evaluate element (2.20) were lower than the standard mean (2.5) and there were the significant differences between them and the standard mean based on their t-values with 53 degrees of freedom at the different significance levels. Therefore, these third stage's elements of curriculum renewal process in Shiraz University for all undergraduate programs based on a strategic approach for ESD was evaluated lower than the standard level.

Table 7. Comparison between the measurements of test & pilot stage's elements compatibility of the curriculum renewal process at Shiraz University for all undergraduate programs with a strategic approach for ESD.

| | M | SD | SM | t | dt | Sig. |
|---------------------------------------|------|------|-----|------|----|------|
| Curriculum renewal strategy | 2 | 1.46 | 2.5 | 2.50 | 53 | .01 |
| Identify graduate attributes | 1.93 | 1.67 | 2.5 | 2.45 | 53 | .01 |
| Map learning pathways | 2.27 | 1.51 | 2.5 | 1.80 | 53 | N.S |
| Audit learning outcomes | 2.26 | 1.50 | 2.5 | 1.16 | 53 | N.S |
| Develop and update curriculum | 2.68 | 1.85 | 2.5 | .74 | 53 | N.S |
| Implement the program | 1.88 | 1.59 | 2.5 | 2.84 | 53 | .006 |
| Raise awareness and build capacity | 2.60 | 1.68 | 2.5 | .44 | 53 | N.S |
| Collaborate internally and externally | 2.03 | 1.68 | 2.5 | 2.03 | 53 | .04 |
| Continually monitor and evaluate | 2.20 | 1.62 | 2.5 | 1.53 | 53 | N.S |

Integrate Stage

The following paragraphs are about the data which were obtained from the participants' answers to questionnaires regard to implementing the integrated stage of curriculum renewal process in Shiraz University based on the strategic approach for ESD.

Table 8 shows the data about the integrated stage as the fourth stage of curriculum renewal process in Shiraz University for all undergraduate programs and its compatibility with the strategic approach for ESD. According to the data in the table, the mean of this stage (2.28) is lower than the standard mean (2.5), and there is no significant difference between them based on the t-value (1.25) with 53 degrees of freedom. So, the fourth stage of curriculum renewal process in Shiraz University for all undergraduate

programs based on the strategic approach for ESD was evaluated around the standard level.

Table 8. Comparison between the measurements of integrates stage compatibility of curriculum renewal process in Shiraz University for all undergraduate programs with a strategic approach for ESD.

| | M | SD | SM | t | dt | Sig. |
|-----------------|------|------|-----|------|----|------|
| Integrate Stage | 2.28 | 1.56 | 2.5 | 1.25 | 53 | N.S |

Also, the table 9 reveals the data evaluation of proportion between the integrate stage's elements in the subject university and the standard model. According to the data, then some elements' mean namely, curriculum renewal strategy element and implement the program were lower than the standard mean and there was no significant difference between them based on the t-values with 53 degrees of freedom. Therefore, these fourth

stage's elements of curriculum renewal process in Shiraz University for all undergraduate programs based on a strategic approach for ESD was evaluated around the standard level. Indeed, the mean of map learning pathways element (2.57), the mean of audit learning outcomes (2.50), the mean of develop and update curriculum element (2.55) and the mean of raise awareness and build capacity element (2.58) were higher than the standard mean (2.5) and there was no significant difference between them based on the t-values with 53 degrees of freedom. Therefore, these fourth stage's elements of curriculum renewal process in Shiraz University for all undergraduate programs based on a strategic approach for ESD were

evaluated around the standard level. However, the mean of element 'identify graduate attributes' (1.88), the mean of continually monitor and evaluate element (2.05) and the mean of collaboration internally and externally (1.93), were lower than the standard mean (2.5) and there were the significant differences between them and the standard mean based on their t-values with 53 degrees of freedom at the different significance levels. Therefore, these fourth stage's elements of curriculum renewal process in Shiraz University for all undergraduate programs based on a strategic approach for ESD was evaluated lower than the standard level.

Table 9. Comparison between the measurements of integrate stage elements compatibility of curriculum renewal process in Shiraz University for all undergraduate programs with a strategic approach for ESD.

| | M | SD | SM | t | dt | Sig. |
|---------------------------------------|------|------|-----|------|----|------|
| Curriculum renewal strategy | 2.37 | 1.22 | 2.5 | .77 | 53 | N.S |
| Identify graduate attributes | 1.88 | 1.65 | 2.5 | 2.74 | 53 | .008 |
| Map learning pathways | 2.57 | 1.45 | 2.5 | .37 | 53 | N.S |
| Audit learning outcomes | 2.50 | 1.86 | 2.5 | .01 | 53 | N.S |
| Develop and update curriculum | 2.55 | 1.79 | 2.5 | .24 | 53 | N.S |
| Implement the program | 2.12 | 1.46 | 2.5 | 1.85 | 53 | N.S |
| Raise awareness and build capacity | 2.58 | 1.58 | 2.5 | .37 | 53 | N.S |
| Collaborate internally and externally | 2.05 | 1.55 | 2.5 | 2.08 | 53 | .04 |
| Continually monitor and evaluate | 1.93 | 1.47 | 2.5 | 2.81 | 53 | .007 |

5. RESULTS

According to the data analysis, the following gaps were realized in the Shiraz University's curriculum renewal process in comparison with a strategic approach for ESD.

The identifying graduate attributes element was identified as a gap between the Shiraz University's curriculum renewal process and standard model within the implementing all stages. Also, the continually monitor and evaluate element was identified as a gap between the Shiraz University's curriculum renewal process and standard model within the explore stage, the test and pilot stage and the integrating stage. The others recognized gap were implementing the program and curriculum renewal strategy which were appeared in the test and pilot stage. The last gap was the collaboration internally and externally in the integrating stage.

6. DISCUSSION

The results seem to have some implications for Shiraz University and other higher educational institutions alike. The element 'identify graduate attributes' as the gap which was realized in all stages, can be considered as the main gap between the curriculum renewal process in the subject university and the strategic approach model. In terms of what is assessed in university curricula, traditionally most academic staff focus more on discipline content than on graduate attributes, with assessment tasks focusing mainly on '...the products of learning' rather than on the '...how and why' of what is to be learned (Anderson, 1998). The other potential reasons behind this vary gap appear to be lack of allocation funds and human resources for identifying the graduate attributes which are said these funds can be long-term investments of immense benefits both to the individual and to the society (Ahmad, 2015), lack of

procedures for identifying the graduate attributes, and lack of interaction between departments to reach agreements on specific graduate attributes (Barrie, 2006). A design team for a new program should consider the place of ESD in the proposed program and make explicit in their documentation how ESD has been considered in the curricula. A rationale should be provided to explain how ESD has been considered in the design process. Learning outcomes with an ESD context should be highlighted, and assessments of ESD attributes made clear. Reference should be made to the graduate outcomes and attributes identified in the guidelines (Longhurst, 2014). However, there are seemingly some external reasons as well contributory to the mentioned internal reasons in Shiraz University. The first curriculum writers who recognized the significance of following up and monitoring the external context in the curriculum renewal process were Reynolds and Skilbeck in the 1970s. The TNEP book *The Natural Advantage Nations: Business opportunities, innovation and governance in the 21st century* presented such a model for a „whole-of-society' approach that offers the external trends that influence the strategy for curriculum renewal as a context. Also, Desha and Hargroves emphasized that identifying graduate attributes of the students requires meaningful interaction between program leaders, educators and external stakeholders such as professional bodies, potential employers, government agencies and the students themselves. This aligns well with sustainable universities' mission that includes the process of teaching and research being inspired by Engagement and partnerships. External drivers for universities to become sustainable include pressure from peer institutions, funding sources and employment availability with the presence of connectors or partnerships with society a vital part of the strategy, like the Edith Cowan University Engagement priority (Scott, 2009). Accordingly, lack of emergent consideration and clear understanding of sustainability as one of the most critical topics shortly in among the social communities, industries, and businesses are the main factors that underplay

identifying graduate attributes in the Iranian universities. The same applied to the higher education system of the country.

The higher education authority in Iran is the Ministry of Science, Research, and Technology (MSRT) which observes all the state universities on a centralized basis. According to Desha's model, the accreditation agencies should not only continue to ensure that educational programs meet compliance, but they shall also force higher education institutions to go beyond compliance and update programs to include an outcome-based approach to education for sustainability through an enhanced accreditation process. Not only has the MRST failed to have an inspirational role in promoting for ESD to date, but the required rudiments, accreditation, and recruitments for identifying the graduate attributes are missing. The same is right about the industry and business sectors. Businesses and industry are also considered to be critical factors. Corporate (social) responsibility may be defined as 'the responsibility of an organization for the impacts of its decisions and activities on society and the environment through transparent and ethical behavior above and beyond its statutory requirements' (Longhurst, 2014). The policies and practices in the industry or business sectors have not changed to affect the employers' expectations of the graduates. The employers do not feel the need to hire graduates with sustainable knowledge and skills. Therefore, the students and faculty members' demand are not likely to change with regard to their preferred knowledge and skills. Indeed, there is the absence of significant interactions between university and industry and business which is other vital factors to cause the gap. This vary deficiency in "identify graduate attributes" affects other elements in the next stages.

According to the results, the second observed gap was the element „Continually monitor and evaluate' which was a deficiency in 2nd, 3rd, and 4th stage. Periodic monitoring and evaluation of each element of curriculum renewal strategy as a dynamic element of the model is the essential part of the process. In fact, regular reviewing the curriculum renewal process will be critical for sure progress of

curriculum updating. The lack of meaningful interaction between university and external trends again is one of the leading causes of weakness in this element. It means, with the passage of time many things change like the market and the employer expectations or legislation. Also, there are some major external reviews such as accreditation review and industry advisory panel recommendations (Desha & Hargroves, 2011). Therefore, this absence directly influences the quality of monitoring and evaluation of the process.

In the stage „test and pilot,' because of some barriers, a disparity was observed in the element „implement the program' between the curriculum renewal process in the subject university and the strategic approach model. Addressing the literature review, the following reasons can constrain this vary element. The lacks of professional bodies, lack of sustainability information and proper language for embedding sustainability in curriculum and process. Sutherland points out: The reasons that faculty find it difficult to assess noncontent outcomes are the same as the reasons they find it difficult to consider using new teaching approaches. Faculties are experts in their field of study. They have spent their professional lives developing skill and confidence in their abilities as chemists, sociologists, rhetoricians, and art historians. Their training and focus have been on content, and few have been supervised or mentored in teaching and evaluating students. Universities don't have a professional body to embed the knowledge and skills for sustainability. In fact, before the identifying graduate attributes should be the professional body equipped with sustainable knowledge, technology, and tools. Also, the lack of meaningful interaction between university and external trends again impacts on the quality of element „implement the program“ and element „Collaborate internally and externally“ which is the key reason why these elements were recognized as the gaps in the 3th and the 4th stage, respectively. A sustainable university would have a societal problem-solving orientation in its curriculum. This may be realized partly by engaging with industry and other organizations, where students solve real and relevant problems in all their complexities and

uncertainties (Ferrer-Balas et al., 2008). However, as noted in the introduction, even the most committed institution will find it difficult to progress without external factors and policy being addressed. There is a need to institutionally integrate sustainable development into all the different functions of a higher education institution and to make an institutional commitment through a sustainability agenda. Although higher education institutions are incorporating sustainability into some of their activities, there remain some challenges to comprehensive adoption and moving from the incremental to the transformational (Johnston, 2006). The integration stage is the last step of the process where the internal and external stakeholder engagement can bring valuable industry experience and credibility to the process, and it is critical in implementing the program. Besides, they can prepare many opportunities for promoting the curriculum, enrolling the students who have sustainability knowledge and experiences by engaging them in their activities including short course and postgraduate offerings, innovative delivery options and articulation opportunities, innovative curriculum for future career pathways, and opportunities for university students to assist with off-campus projects in industry, school or the wider community (Desha & Hargroves, 2011).

7. DISCUSSION AND CONCLUSION

This article has compared the curriculum renewal process in Shiraz University for undergraduate programs with the strategic approach for ESD. This comparison was made by surveying from a large group of Shiraz University's faculty members who are curriculum development council's members about the quality level of acting in the process of curriculum renewal for ESD in the Shiraz University's programs. With analyzing the results of the mentioned survey, we found that there were some gaps between the curriculum renewal process in Shiraz University for undergraduate programs and the strategic approach for ESD. In fact, the deficiencies were observed in the same elements of the stages. For an in-depth understanding of the causes of these weaknesses, we review the

literature and documents in related fields with education and ESD. The main reasons, which have caused those gaps, come from external issues of Shiraz University such as society, MRST, industry, and business. These influence on universities decision-making for any changes in their curriculums. Universities and institutes as a social system have to

respond to their external environment. They are open systems and depend on exchanges with environmental elements to survive. Multiple environmental influences come from different levels of society and affect what happens in the educational system (Miskel, 2012).

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