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Prevalence of chronic kidney disease-associated pruritus, and association with depression among hemodialysis patients in Khyber Pakhtunkhwa

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Abstract

Chronic kidney disease-associated pruritus (CKD-aP), formerly known as the uremic pruritus, is commonly observed in the patients with the hemodialysis. This study aimed to determine the prevalence of the Ckd-aP and to associate it with depression in hemodialysis patients. A multicenter cross-sectional study was conducted on the patients of CKD-aP Khyber Pakhtunkhwa, from March 2021 to March 2022. This research was conducted at multiple hospitals in the Khyber Pakhtunkhwa (different hospitals such as Hayat Abad Medical Complex, Zia Medical complex, Irfan General Hospital, and others). The sample size for this research was 1000, of which 700 were confirmed patients with the CKD-aP. Research shows that the prevalence of CKD-aP is higher in males than in females. This disease creates a negative impact on mental health and causes a range of depressive disorders, among diseased persons.

Keywords.

Chronic kidney disease-associated pruritus (CKD-aP), diseased, and depression.

Introduction

Chronic kidney disease-associated pruritus (CKD-aP), is formerly known as uremic pruritus. Pruritus is a persistent condition that is dominantly discerned in patients with CKD. (2) Previous studies conducted reported more than 50% of the disease's prevalence, all over the world. CKD also called chronic kidney failure entails a restrained loss of kidney function. For instance, kidney filters mediate the wasting of surplus fluid from the blood, which is then eliminated from the body with the urine. CKD ends with excess release, electrolyte imbalance, and other serve consequences. (3) Initial stages mark the diseases with the symptoms of vomiting, weakness, sleep problems, appetite loss, weakness, muscle cramps, high blood pressure, chest pain, itchy skin, and other things. (4) CKD may be the result of certain kind of diseases which causes a disproportion of the fluid particularly high blood pressure, type 1, and type 2 diabetes, interstitial nephritis, glomerulonephritis, polycystic kidney diseases, vesicoureteral reflux, and prolonged urinary tract obstruction due to the cancers, and kidney stones. Whereas CKD-ap is the form of itching that last more than 6 weeks and is called chronic pruritus. Sometimes it is considered as the treatment side effects that badly impact the patient mood, relationship, self-esteem, and quality of life. (5) Research reported that chronic kidney disease-associated pruritus is majorly observed in the people who experience dialysis. (6)

Furthermore, pruritus is reported in patients that do not use dialysis, but that are suffering from improper kidney functions. (7) These patients belong to the CKD stages 3-5, with the enhancement of the prevalence along with the intensifying function of the kidney. (8) Studies show that more than 40% of the patients reported intense itching. This itching ranges from moderate level to severe levels in the patients. CKD-aP is thought to be the agglomeration of the uremic released toxins that is due to the lower quality hemodialysis of the patients, and the developing decline ratio of the renal function. (9) Another major cause of the CKD-aP is a higher level of calcium, phosphorous, and parathyroid hormone, all of them are reported in different studies to cause pruritus'. (10) Also, some vitamin deficiency such as vitamin A, and other causes

skin issues in chronic kidney failure. (11) This led to the systematic inflammation or the inflammation of the skin. Furthermore, some of the studies reported that the immune system mediates the rapid production of cytokines particularly IL-2, IL-6, mast cells, and the T lymphocytes resulting in skin itching. (12)

Inflammation results in heat, and pain to the body parts which causes the patients to scratch the area and sometimes results in bleeding. (13) The body increases the production of the pruritogens such as IL-31, and histamine, which are associated with itching, and potentially end with neurogenic pruritis. Immune cells and skin cells simulate the perceptive peripheral sensory nerve fibers. Then in the dorsal root itch signal is transferred, then in the dorsal horn, then in different brain regions, which mediated the scratching. So, the association of the perceptive itching with the neurogenetic citing consequence in the CKD-aP. (14)

It is more than itching, as it enhances the rate of mortality and morbidity, and decreases the quality of the life. (15) On both peritoneal dialysis, and hemodialysis CKD-aP is influenced similarly. In some of the research, it is reported that this disease is present in post-renal transplants with a prevalence of 12%. The pathophysiology of this condition is complicated and involves a range of mechanisms. (16) The etiology of the disease is also complex and needs the presence of some particular factors that are linked with increasing the chance of causing CKD-aP. For instance, hepatitis c results in the use of arteriovenous graft. This needs vascular access for the hemodialysis. Moreover, dry skin is also considered for the pathogenesis of the disease. As dry skin is the process that causes alterations in the skin pH and enhances the urea excretion on the skin. Pathogenesis is also because of the opioid receptor. The study reported that patients treated with difelikeflain show pruritus relief. Some of the immune dysregulations are also responsible such as inflammatory markers like C-reactive protein are observed in the patients with the CKD-aP. (17)

For treatment purposes, numerous agents are reported. This medical expert takes the history of the patients and mediates the treatment process by suggesting some suitable moisturizers. Other studies reported the antihistamine, steroids, ultraviolet B, and opioid receptors as the agents for the treatment.(18) Acupuncture and acupressure for treating uremic pruritis are also reported that suggest positive results. (19)

This itching and severe pain for a longer duration cause the patients to wake up late at night. It is unbearable, make the patients aggressive, and developed mood swings. Eventually, it causes depression. Duration, types, and severity of depression vary from patient to patient. (20) Major types of the depression that are observed in the diseased person include the major depressive disorder which lasts longer more than two weeks, psychotic depression which ends in hallucinations, delusions it is more severe form it causes the patients to feel, hear, and sense different things because they disrupted the sleep cycle. Also, persistent depressive disorder is observed in people which lose interest in daily activities, and this ends in more than two years. (21)

In this study, we determine the prevalence of the CKD-aP and associated it with the types of depression. As depression is quite common in these diseases, none of the previous studies report that. So, this study will be greatly beneficial in terms of understanding the patient condition of the mind. So, the patient will be treated accordingly.

Methodology.

A multicenter cross-sectional study was conducted on the patients of CKD-aP Khyber-Pakhtunkhwa. Pruritus influence in terms of depression was determined in the patients that go through hemodialysis from March 2021 to March 2022. this research was conducted at multiple hospitals in the Khyber Pakhtunkhwa (different hospitals such as Hayat Abad Medical Complex, Zia Medical complex, Irfan General Hospital, and others). The sample size for this research was 700 confirmed patients with CKD-aP.

Inclusion, and Exclusion criteria.

Patients who were suffering from the CKD-aP in both genders and undergoing hemodialysis were selected. Also, patients who report some type of depression were included in the study. However, the patient who does not report depression were not included in the research project.

Procedure

More than 700 (1000) patients were included in this research. The sample size was based on a confidence interval of 95% and with a precision of 5%. while the patients were undergoing the hemodialysis, we approach the patients. Patients signed the informed consent forms and confirmed their willingness to be a part of the research.

Data were collected from the patients in which their medical history, CDK-aP, and depression-related question were asked. To understand the severity of depression in the patients, we designed a questionnaire that asks about the patient's lifestyle, diet intake, questions related to sleep disturbance, depression symptoms, and other things.

As mentioned above the research was conducted at the dialysis center of the department of Nephrology, in different hospitals such as Hayat Abad Medical Complex, Zia Medical complex, Irfan General Hospital, and others. This research project was approved by the research board Kyber Pakhtunkhwa. Later on, the ethical, and review board also approved the study. Nephrologists in the above-mentioned hospital referred the patients to participate in the study. The patients were divided into two groups. 1st group is those who were suffering from CDK-aP disease, level 1-3, this group includes 400 people, 2nd group target the CDK-aP disease with the 4-5 level.

After taking the written consent form from the participants, a questionnaire regarding disease severity, and depression was filled out by the patients. Enrolled patients were 700 patients. We determined the prevalence of the chronic kidney diseases that are associated with pruritus. Among them 400 patients with the stages of 1-3, and 300 patients with the stages of 4-5. Also, the ratio of the depression was determined in both groups.

**The total
number of
participants.**

**Among 1000 patients, 700 patients were
selected with clinically confirmed CKD. These
selected patients were confirmed by the
nephrologist.**

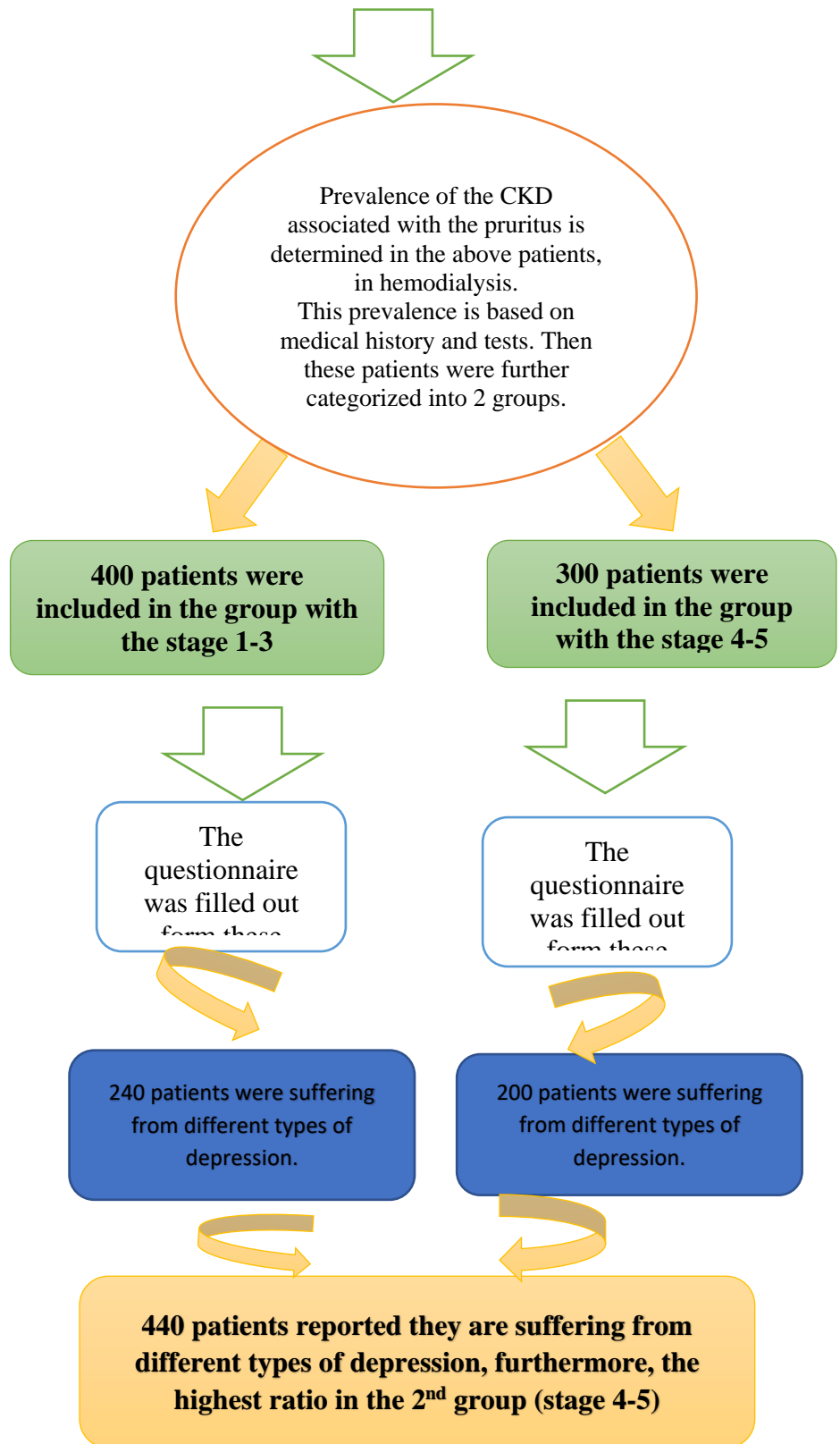


Figure 1. Flowsheet of complete research methodology.

The Likert scale (22) was used to determine the questionnaire. Diverse types of the parameters such as the types of depression, the severity of the depression, and lifestyle are set on the Likert scale analysis. We provide the instructions to the participants on how to fill the questionnaire, moreover, we provide the questionnaire during the different duration of the dialysis. As we want to analyze the influence of dialysis at various stages.

Results

Demographics of the patients n=1000

Parameters	Total Number of the Patients =1000	Without Purities. =300	With purities. =700
Prevalence is based on gender Distribution.			
Male	600 (60%)	200(33%)	400(77%)
Female	400(40%)	100(25%)	300(75%)
Prevalence is based on the age			
18-30 Years.	300	90	120
31-60 Years.	600	160	500
60 Years Above.	100	50	80
Prevalence of pruritus based on stages.			
Stage 1-3	28% of male	20% of female	
Stage 4-5	49% of male	40% of female	

Results show that the prevalence of chronic kidney diseases is more among the males 60%, than the females 40%. Also, among 600 males 400 show the influence of pruritus, which means that the prevalence of pruritus is 77% among males with chronic kidney

diseases. In females, 300 females show the pruritus effect after chronic kidney diseases which means that the prevalence is 75%. However, the prevalence of the CKD-aP is more in the age group of 31-60 years. Furthermore, the prevalence of CKD-aP is higher in stages 4-5.

Table 2. PSQI Questionnaire Responses.

Last month, at which time did you go to the bed?	Participants.
7 pm	30%
11 pm	44%
1 pm	4%
Do you feel hopelessness or emptiness?	45%
Do you feel frustrated, irritable, and anxiety	30%
Do you face sleep disturbances?	20%
You see different faces and the noises.	4%
You don't want to talk to anyone.	45%
You are hopeful about your medical condition.	33%
You feel negative about your family.	12%
You suddenly woke up late at night.	22%
You don't want to discuss your medical conditions.	32%
Do you have any thoughts related to suicide?	11%
You don't want to consume food properly.	2%
You overly think about the future.	64%
Your life is not fair to yourself.	32%
You sense the hallucinations and tell them to your doctors.	11%
You want to take a rest, but you can't.	2%

Table 3. Prevalence of the depression among the CKD-aP patients.

Types of depression	Severe Depression	Moderate Depression	Depression for 1 week.
Major depressive	58%	30%	12%

disorder			
Psychotic depression	15%	40%	45%
Persistent depressive disorder	60%	35%	5%

This table shows that prevalence of the persistent depressive disorders is more severe in the patients. Major depressive disorders are also commonly observed in patients. However, the prevalence of the psychotic disorder is less severe in diseased persons.

Discussion

CKD-aP is the most recurrent obstacle that is marked in hemodialysis patients. In the previous studies, the prevalence of the disease was determined that vary from 22% to 84%. This study also presents the prevalence of the disease while associating it with depression. This study provides the details of the prevalence based on the gender, diseases stages, and the age of the diseased person. In the study prevalence was 79%, however, in our study prevalence is 70%. (23,24) This prevalence has major relevancy among other diseases in Pakistan. As our study shows that the incidence of the diseases is more severe in the diseases stage 4-5. However, previous studies do not report the disease severity based on the states, they reported the severity of the disease based on the symptoms and other things.(25,26) We discussed depression and the types of depression in this stud. Furthermore, we analyze the prevalence that is based on the depression, we associated it with the CKD-aP. Also, the previous study determines the prevalence yet regarded with the sleep quality, and other diseases such as obesities, diabetes, and others. (26) However, we majorly focused on the depression prevalence among the CKD-aP. Previous studies show that the longer duration causes a severe impact on the health of the patients, after the hemodialysis. The current study also reported this by making two groups. Group 2 is presenting those patients that are suffering from the disease for a longer time. Our study shows that the prevalence is slightly higher in the males than the females, however, some of the studies reported that the female ratio is higher. Patients' data regarding the questionnaire tells that people face several kinds of sleeping difficulties. We determine that patient's lifestyle is badly influenced by this sleep disturbance which ends with depression. None of the studies associate the diseases with depression. We also categorized the prevalence in types of

depression, and we determined that the major depressive disorders and persistent depressive disorders are frequently observed in the patients. However, previous studies do not report any of these findings.

Strength, and Limitations.

The strength of this study is that it is the 1st study in Pakistan that associated the CKD-aP with depression. As many people do not consider the patient's state of the mind. Another center is that it is a multicenter study that involved different centers. It is not particular to the one hospital or specific area.

Limitations of this study include the data collected from the patient. This study needs more in-depth data collection to report accurate major findings. However, CKD-aP is a very irritable disease, which makes the patients incredibly angry in small situations.

Conclusion.

Findings show that the prevalence of the CKD-aP is higher in males than in females. This disease creates a negative impact on mental health and causes a range of depressive disorders, among the patients. To suggest the treatment for the patients, it is beneficial to determine the patient's state of mind and suggest the treatment accordingly. Chronic kidney disease-associated pruritus (CKD-aP), is formerly known as uremic pruritus. Pruritus is a persistent condition that is dominantly discerned in patients with CKD. CKD may be the result of certain kind of diseases which causes a disproportion of the fluid particularly high blood pressure, type 1, and type 2 diabetes, interstitial nephritis, glomerulonephritis, polycystic kidney diseases, vesicoureteral reflux, and prolonged urinary tract obstruction due to the cancers, and kidney stones. CKD-ap is the form of itching that last more than 6 weeks and is called chronic pruritus. Major types of the depression that are observed in the diseased person include the major depressive disorder which lasts longer more than two weeks, psychotic depression which ends in hallucinations, delusions it is more serve form it causes the patients to feel, hear, and sense different things because they disrupted the sleep cycle.

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Role of Religious Orientation for the relationship between self-compassion and Psychological well-being of youth

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Introduction

Life satisfaction-life satisfaction is an important construct in positive psychology

(Gilman and Huebner

[2003](#)). Measures of LS are sensitive to the entire spectrum of functioning, and thus,

provide

indicators of both well-being and psychopathology

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For any person, no matter at which age, peace, hope, and satisfaction are the priorities. Especially when it comes to adulthood or later, the people remain in search of self-compassion (Khan & Kawa, 2015; Lawler-Row, et al., 2005). Different people have different views regarding achieving satisfaction, and thus scholars have also debated in this field from different perspectives (Maltby, Day, & Lewis, 2010). Some of them found positive co-relation between self-compassion, whereas some indicated the strongest relationship between self-compassion and psychological well-being (Dyke, Glenwick, Cecero, & Kim, 2009). However, some of the authors have highlighted that psychological well-being and self-compassion is highly based on spirituality and religiousness (Khashab, Khashab, Mohammadi, Zarabipour, & Malekpour, 2015). Spirituality and religiousness have been playing an important part in humans' life, and are generally associated with human satisfaction (Toussaint, Marschall, & Williams, 2012). It is a belief of all, no matter belonging to which religion, that God has given them life with a purpose (Ismail & Desmukh, 2012). God has guided the human being through different Prophets that life is given to bring positive change in the society, and thus it is obligatory to follow ethical and moral rules of life, in order to keep peace and happiness in the regions (Lawler-Row, et al., 2005). The people are guided to tell truth, forgive others, help the nations, remove hunger, smile, spread happiness, remain positive, be ethical, and morally deal with others in society (Yang, Zhang, & Kou, 2016). When people follow their religious guidelines, they find them being forgiven by God and feel as achieved something marvelous in their lives (Dyke, Glenwick, Cecero, & Kim, 2009; Lawler-Row, et al., 2005). This is what gave them psychological peace and keep them satisfied (Koenig & Larson, 2001).

Statement of Problem

The studies have shown that the knowledge of religion stops youth from attempting any negative activity, such as substance abuse, illegal affairs, theft, and other activities. The religious commitment restricts the person to perform all tasks as per the religious guidelines, and prayer keeps them mentally peaceful and strong. Thus, religious commitment is found to be highly linked with self-compassion and psychological well-being (Maltby, Day, & Lewis, 2010; Park, 2007; Neff & McGehee, 2019; Dyke, Glenwick, Cecero, & Kim, 2009). The current study will now study the link between religious orientation, self-compassion and psychological well-being of the youth.

Purpose of the Study

There are lots of researches (Koenig & Larson, 2001; Neff & McGehee, 2019; Worthington, Berry, & Parrott, 2001; Lawler-Row, et al., 2005) from last years on self-compassion, self –compassion and psychological well- being, and psychological well-being with a religious orientation (Neff & McGehee, 2019; Maltby, Day, & Lewis, 2010). But there is not any single study that measures the relation between self-compassion and psychological well-being of the youth of Pakistan with the mediating role of religious orientation. Self-compassion a concept given by (Neff, 2003) self-compassion is a healthy and positive self-attitude. The self -compassion supports the psychological well-being so there are numbers of researches are proposed on self-compassion and positive psychology construct. But fewer studies were conducted on self-compassion with a religious orientation or religiosity (Patel, Flisher, & McGorry, 2007; Worthington, Berry, & Parrott, 2001; Dyke, Glenwick, Cecero, & Kim, 2009). Thus, the purpose of the current study is to explore the relationship of these variable as we all know that adolescence and young adults have a

life which is full of transitions, some young adults success fully cope with that change but sometimes it was difficult for them and don't know how to deal with it? This affects their mental health and self –esteem. They become self-critic. Thus, this study will explore the relation of self-compassion and psychological well-being of youth with religious orientations.

Objectives

Following are the research objectives;

- To analyze the types of religious orientation and its impact on the psychological well-being of the Youth.
- To assess the relationship between self -compassion and religious orientation of youth.
- To measure the relationship between religious orientation and psychological well-being of youth.
- To examine the mediating effect of religious orientation between self-compassion and psychological well-being of youth.

Research Questions

On the basis of the above research objectives, the current study will answer the following research questions;

RQ1: What are different types of religious orientation which leave negative or positive impact on the youth's life?

RQ2: How the relationship can be assessed between self -compassion and religious orientation of youth?

RQ3: How to measure the relationship between religious orientation and psychological well-being of youth?

RQ4: What mediating effect does exist between religious orientation, self-compassion and psychological well-being of youth?

Significance of Study

The present study aims to analyze the relation between self-compassion and psychological well-being of youth of Pakistan with the mediating role of religious orientation. This will be a great contribution in the field of psychology, as this will help the parents, educators, and psychologists to understand which factors can improve the self-compassion and the psychological well-being of the youth in Pakistan. Everyone in Pakistani society needs to understand that religious orientation is crucial to let youth understand their targets. The better they understand and accept the realities, the more they show psychological well-being.

Theoretical Framework

Theories and literature also shows that religion prevents all aggressive and tiring activities, and guides the person to stay calm, organized, and happy (Maltby, Day, & Lewis, 2010). Religion helps the person to know who he is and to understand his purpose of life and develop self-compassion amongst the youth (Park, 2007). The concept of self-compassion is very important to understand the psychological condition of youth. Every religion, from Buddhist Philosophy to Islam, guides the individual to understand their realities and accept them as they are (Toussaint, Marschall, & Williams, 2012). The religion guides the person to improve self-control and leave the rest on God. Thus, the individuals with strong religion background are found to be having strong self-compassion, which leads to psychological well-being of the person (Neff & McGehee, 2019).

Religion helps the adolescents to understand the purpose of their life (Toussaint, Marschall, & Williams, 2012; Maltby, Day, & Lewis, 2010). The studies have shown (Koenig & Larson, 2001; Worthington, Berry, & Parrott, 2001; Dyke, Glenwick, Cecero, & Kim, 2009; Maltby, Day, & Lewis, 2010) youth face a rapid social change in their lives. They are exposed to different biological changes, after which they remain weak in controlling their emotional situation, leading to less self-compassion capabilities amongst them (Rye & Pargament, 2002). Thus, in such situation, the youth remain unable to understand the facts, and accept the things as they are, and thus adopt illegal and unethical way for the fulfilment of desires. Maltby, Day, & Lewis (2010) also highlight the relationship between Religious orientation, self-compassion, and psychological well-being. This study focused on different factors, such as the race of life, disappointments, lack of opportunities, lack of obedience, and other social issues lead to stress amongst youth. The literature showed that the unethical activities amongst the youth lead to stress, which is significantly related to suicide, depression, and anxiety (Park, 2007; Maltby, Day, & Lewis, 2010). The more the person remain in touch to God via prayers, the less he tries or attempts negative activities. Prayer and religious activities protects the individual from any sort of evil activities (Maltby, Day, & Lewis, 2010).

Methodology

A lot of literature has been already published to highlight the role of self-compassion in supporting psychological well-being amongst youth with the impact of religious orientation. However, the current study will focus on the psychological impact of religious orientation on the youth of Pakistan. This will make it more relevant to the Pakistani People, and will be helpful to better understand the connection between religion and the psychology.

Research Method

The research process is to analyze the impact of religious orientation on the psychological well-being of the Pakistani youth, and thus the current study has analyzed the already published studies and reports regarding the research topic. The research relies on the qualitative approach, where the work and theories of other scholars was used to infer something out of existing literature. For this purpose, a lot of research articles and reports were collected through search engines, like Google Scholar. Different keywords, such as psychology well-being, Pakistani youth and religious orientation, and impact of religion on psychological well-being, were used to collect the studies.

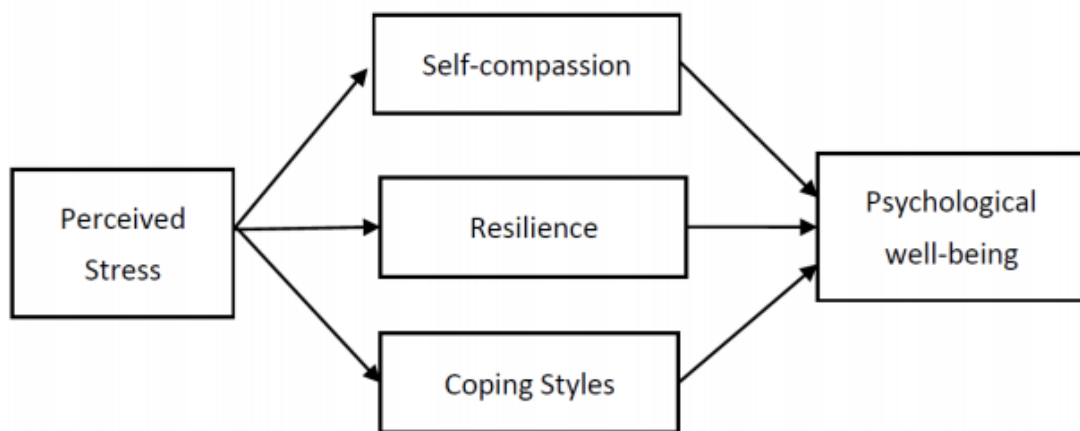
Variables of Study

The study is the assessment of role of self-compassion in supporting psychological well-being amongst youth, with the impact of religious orientation, and thus the study rely on three variables. These three variables are; self-compassion, psychological well-being, and religious orientations. However, the psychological well-being is treated is dependent variable over the other two variables, as the change in self-compassion or religious orientation lead to distress, anxiety, and psychological disturbance amongst the youth. Thus, any change in self-compassion and religious orientation directly and indirectly influence the psychological well-being of the youth in Pakistan.

Study Model

Garcia, Kjell, & Nima (2014) introduced a model in which the psychological well-being of an individual is highly dependent on several other factors. Also, the study indicated that the person's happiness is highly dependent over the psychological well-being, which enable the individual to accept the social enviornemnt and

promotes acceptance to the environmental changes. The model highlighted that psychological well-being is highly dependent over several factors, which includes self-compassion, resilience, and coping style. Self-compassion is the acceptance to the facts, whereas coping style can be efficiently guided by the religious approach. Thus, the current study is based on this model, in which the self-compassion and religious orientations are the major variables to influence the psychological well-being of the youth in Pakistan.



Data Collection and Analysis

The data was collected via using search engines and specified keywords related to the research topic. Initially around 250 articles were collected, out of which old dated and irrelevant articles were extracted and only 100 articles were used for further analysis of the study. Each study was deeply analyzed and the useful data was extracted and stored in separate files. Finally all data was re-arranged to prove the hypotheses either true or false.

Ethical Considerations

The purpose of the current study is to bring a positive change in the society and that is why all collected data was gathered in ethical way. All open source articles were collected and the data was used to develop a positive approach for the society.

Nothing was used for illegal or unethical reasons. Moreover, no information is being used for personal biased and the approach was only to dig out something better and useful for the psychological field, as well as Pakistani youth.

Data Analysis

Religious Orientation

Religious orientation of a person or the community involves belief or presumption about the existence of God, morality, prescription, and spirituality. It is all about the person's belief of how he/she is going to perform his religious activities and what he/she is going to get in return. It is psychological impact on a person that he/she find peace when performing religious or ethical activities, such as going to Church or Mosque bring great peace and calmness in the personality. According to Whitley and Kit, religion leaves deep psychological impact and also leaves direct impact on person's approach towards peace and success. The study investigated the relationship between two factors; religiosity and the indicators, such as peace, and the evaluated how does the religious practices impact the person's life? The findings of the study showed that "religious involvement was consistently correlated with a variety of forms of prejudice." (Whitley & Kite, 2010)

Religious activities not only impact the personal life but also leave deep impact on the relations and approach towards dealings. Religious orientations keeps individuals' directions towards the justified practices and thus religions strengthens the relationships and stops the person from being indulged into unethical or immoral activities. It helps the individual to respect the relations and keep them happy, which creates a strong bond amongst the people in the society (Worthington, Berry, & Parrott, 2001). It develops the strongest relation between husband and wife, neighbors, children and parents, sisters, brothers, siblings, and relatives (Worthington,

Berry, & Parrott, 2001). In this way, the individual does not remain alone during the hard times and thus does not find himself in trouble during any situation (Dyke, Glenwick, Cecero, & Kim, 2009). This prevents any sort of psychological distress and thus promotes peace and psychological well-being amongst the followers.

In other words, religion orientation is the approach toward life and involves behaving, feeling, and thinking in accordance with beliefs, as guided by religious institutions (Zinnbauer, et al., 1997). Religious orientation prevents any unethical attempt or illegal approach towards getting uncontrollable desires, such as earning countless money via illegal way, and guides the followers regarding how they can perform well in their lives without getting involved into unethical activities. The more the person remain in touch to God via prayers, the less he tries or attempts negative activities.

Prayer and religious activities protects the individual from any sort of evil activities. The religious person do not attempt any negative activity and find himself as forgiven by God. In this way, the followers with religious orientation remain less involved in unethical activities and showed more psychological well-being. Thus, religious activities, such as offering prayer or reading the Holy Book, gives an impression that God has forgiven the individual, and thus the concept of being forgiven provides peace deep inside the personality. This peace is highly essential because it prevents the person from attempting any unethical or illegal activity, such as suicide (Maltby, Day, & Lewis, 2010). Offering prayer, saying thanks to God, and believing God for little things is the only way to have full control over everything in life. This also improves the self-compassion amongst the followers. However, there are several types of Religious Orientation, which are described below;

Extrinsic Religious Orientation

It defines the use of religious beliefs to achieve non-religious goals (Batson, 1982). It is used by the people, who goes to the religious gatherings and then involves the religion in their all lively activities to achieve some social goals. For example, the politicians who participate in religious activities just to show people his strong relation with religion. Such followers maintain a social network to guides others about how can they perform well in their lives from their religious perspectives, but actually desire to achieve their personal goals in return. It is just a way to reflect strong influence of the religion over the life, where the person has actually no strong relation with religion. They find it socially helpful to follow everything on the basis of religious guidelines and use it to achieve their unattainable goals. As stated by Gordon Allport, extrinsic religious approach is obtained when the person use religion “to provide security and solace, sociability and distraction, status and self-justification.” (Allport & Ross, 1967, pp. 432-443)

Intrinsic Religious Orientation

Intrinsic Religious Orientation is exactly opposite to the extrinsic religious orientation. It defines the use of religious beliefs to achieve peace and strengthen the relation with God (Batson, 1982). The followers with this type of religious orientation apply religion to their all social practices for the sake of achieving peace and keeping the God happy, in return their achieve satisfaction. Daniel Batson defined intrinsic religion as ‘While the people with extrinsic religious orientation find religion as a mean to an end, the people with intrinsic approach find religions as that end.’ This makes a huge difference, but only the real followers can understand it.

The intrinsic religious orientation also involves the preaching and guidance to others, through which the followers find their goals accomplished. They guide others

how to act according to religion and stops them from doing any sort of unethical or immoral activities. They truly contribute their strengths to bring positivity in the society and keeps the social approach as per guided by their Prophets or by their Holy Books, such as Muslim follows the Muhammad (P.B.U.H) and the Holy Book Quran. As said

"An active directing force, not just a tool used to reach self-serving ends." (Batson, 1982, p. 807)

Quest Religious Orientation

Quest religious orientation neither believes on approach towards social benefits nor adopting religion to the end. It is focused to search for the truth. The follower with Quest Religious Orientation research for the truth, that in case the religion has guided me this practice and how it is going to benefit me and my society from the ethical and moral perspective. It is about searching for the right answers of the questions. Such followers do not believe of how the things were preached before or how others are using religion in their practices, instead they study, research, and practice the right guidelines which leads to satisfaction and peace in their lives. As stated by Batson;

"An individual who approaches religion in this way recognizes that he or she does not know, and probably never will know, the final truth about such matters. Still the questions are deemed important, and however tentative and subject to changes, answers are sought." (pp.821)

Approaches to Religious Orientation

Several scholars have investigated how does religious orientation impact followers' social practices? The findings answered in three most prominent approaches towards religions; extrinsic approach, intrinsic approach, quest approach.

These approaches and their impact on life are well defined by the psychologists and well-known scholars, such as Gordon Allport, Daniel Batson, and Richard Gorsuch (Batson, 1982; Gorsuch, 1989). According to these scholars, there are three basic approaches towards religious orientation; when the person use it for personal benefits, when the person use it to extreme, and when the person use it in search of truth. However, all approaches lead to self-satisfaction amongst the followers (Krauss & Hood, 2013).

Religion and Personal Benefits

Gordon Allport highlighted that when the religion is used to achieve the personal benefits, it reflects the extrinsic approach. The personal benefit may be any, such as political benefits, personal security, social impression, and self-justification (Gorsuch, 1989). When the person use religion for non-religious purpose, that approach may be justified or sometimes not. For example, if the person is living in Muslim society and is forced to practice Islam, he/she may reflect of practicing Islam for the sake of personal security. On the other hand if the person is using religion to gain personal benefits, such as leaders reflects their religious activities to justify their leadership and attain personal benefits, then the approach is used in unjustified manner. Such followers maintain a religious social network to reflect their attachment with religion and do not actually follow it by heart. However, such type of religious approach may be said as unethical, as the person is not using the approach in right way and thus deceiving the society, as well as himself.

Religious Orientation of Batson and Showinerdand, and External Orientations of Allport and Rosses are also helpful to understand the strong relationship between religion and psychological well-being. The reason behind this strong relations is the knowledge of right and wrong. Religion guides the person about what should be

attempted and what should be avoided. In this way, the individual remains protected from any sort of evil activity and thus remain mentally satisfied and physically healthy. Religion is a guidance or the pattern and now it depends how the followers are going to use these patterns in their life, some of them use it to achieve goals in their lives, where as some use it in search of truth. However, religion is a set of guidelines to define the ethics and morality of life and thus prevents the person from doing any sort of unethical or immoral activity. It maintains the social discipline by preventing any sort of illegal, negative, or unethical approach towards achievement of targets and thus guides the actual way of approaching the satisfaction and relief in life. Every religion has separate patterns and guidelines, but the approach of all is to bring positive change in the society, prevent evil activities, and achieve satisfaction by developing strong relationship with God. This bring the feeling of being forgiven, with which the person achieve the highest level of satisfaction, which in return contribute to the peace and psychological well-being.

Religion to the Extreme

The second approach is well defined by Denial Botson, that when the person use the religion to the end, it is said as intrinsic religious approach. It is about practicing religion to the extreme. For example, when the person practice Islam in to the extreme that he force others to do the same then it is said as intrinsic approach. Such people may get furious to the ones, who do not follow the religion and sometimes may lead to the violence to force others for obedience to God and religion. Such type of people touches the extremes of their religious approach (Batson, 1982).

Search for Truth

Finally, the third approach is the real approach of religion, where the person use religions for the sake of personal grooming and satisfaction. As explained by

Richard Gorsuch, that when the person adopts religion in search of truth and for the sake of satisfaction, then he is on the right track. Religion is not a belief to be followed for others or to the extremes, instead it is about getting the answers of the questions, which guides the actual meanings of life. Such followers adopts religions for the sake of self-satisfaction and to strength approach to the eternity (Gorsuch, 1989).

Analysis

Youth is found to be more indulged in negative activities due to their curiosity and desire to attempt every new thing in their life. The biological changes and new exposure to social circles prove to be great promoters to the evil (Patel, Flisher, & McGorry, 2007). The youth interaction with new people and unstoppable passions removed the difference between ethical and unethical approaches. Then the youth is left with an emotional approach with their desire to get everything (Ismail & Desmukh, 2012). At this stage, lack of money, lack of resources, restrictions from society, and desire to do more prove to be great contributors to psychological distress and anxiety (Neff & McGehee, 2019). As a result of which the individual follows wrong directions to achieve their goals. For example, the suspiciousness and curiosity to know the impact of substance over the human mind lead to the first substance attempt, and then the attempt turns into a habit and then to the substance abuse (Radloff, 1977; Meer & Mir, 2014). Similarly, the desire to achieve everything and to be rich leads to theft (Khashab, Khashab, Mohammadi, Zarabipour, & Malekpour, 2015). This is because the boys and girls of a young age are not mature enough to understand the facts and realities of life, leading to less self-compassion. Also, the lack of religious knowledge does not let them differentiate between good and bad. Finally, they are left with nothing but just psychological distress, anxiety, and mental

sickness (Patel, Flisher, & McGorry, 2007). On the contrary, the youth with appropriate knowledge of their religion and purpose of life understand the actual purpose of life (Dyke, Glenwick, Cecero, & Kim, 2009). They remain focused on their specified targets and consult with God in case of any stress or anxiety. This gives them relief and makes them psychologically strong (Maltby, Day, & Lewis, 2010).

Conclusion

Religion entails particularly boundaries, customs, and beliefs of a society, and thus provides meaningfulness in life, motivates the individual to do something for the better future of society, and promotes goal-oriented behavior amongst the believers (Park, 2007). In other words, religion gives meaning to life and involves behaving, feeling, and thinking in accordance with beliefs, as guided by religious institutions (Zinnbauer, et al., 1997). However, it also matters to which extent the person is following religious beliefs (Meer & Mir, 2014). This measurement can be associated with religious commitment, which defines the level of engagement of an individual to his religion (Rye & Pargament, 2002). One indicator of the religious commitment is intrinsic, according to which the person is said to be living according to religious beliefs and following his religion in all aspects of life (Joshi & Kumari, 2011).

Worthington et al (2003) also defined religious commitment as;

“The degree to which a person adheres to his or her religious values, beliefs, and practices and uses them in daily living” (p. 85).

Religion brings patience, peace, and satisfaction in the personality, because it prevents all harmful and unhealthy activities to the person (Dyke, Glenwick, Cecero, & Kim, 2009; Zinnbauer, et al., 1997). It defines a healthy lifestyle to the followers, with the follow-up of which the individual remains healthy and calm (Dyke, Glenwick, Cecero, & Kim, 2009). It prevents all aggressive and tiring activities and

guides the person to stay calm, organized, and happy. Religion helps the person to know who he is and to understand his purpose of life (Koenig & Larson, 2001). It prevents the follow up of illegal activities and stop the individual from running behind the unachievable targets, such as money (Park, 2007). It guides for the simplest life, which is easiest to achieve and thus the person remains satisfied for what he has and for what he can achieve (Koenig & Larson, 2001). Religions help the individual to respect the relations and keep them happy, which creates a strong bond amongst the people in the society (Worthington, Berry, & Parrott, 2001). It develops the strongest relation between husband and wife, neighbors, children and parents, sisters, brothers, siblings, and relatives (Worthington, Berry, & Parrott, 2001). In this way, the individual does not remain alone during the hard times and thus does not find himself in trouble during any situation (Dyke, Glenwick, Cecero, & Kim, 2009). This prevents any sort of psychological distress and thus promotes peace and psychological well-being amongst the followers.

Especially when it comes to youth or adolescence, the individual face rapid social, cognitive, and biological changes. These normative development changes lead to several stress and mental health problems amongst them (Khan & Kawa, 2015). According to the estimates, the mental health issues amongst the youth and adolescence are found to be 10 to 20%, which contribute to poor education, substance misuse, physical illness, and other social problems in later life. This leads to the situation, where the youth becomes a social burden to the global economy and thus they are left with nothing but just depression, anxiety, and stress. In such a situation the only thing which can help them in social well-being is found to be religious commitment. The more the person will understand his religion, the less he will get

engaged to unethical activities, and thus less he will face social issues (Joshi & Kumari, 2011; Lawler-Row, et al., 2005).

During the biological and emotional changes, the youth do not understand the actual purpose of their life and thus remain emotionally disturbed (Koenig & Larson, 2001). Moreover, the race of life, disappointments, lack of opportunities, lack of obedience, and other social issues lead to stress amongst youth (Worthington, Berry, & Parrott, 2001). This stress in youth is significantly related to suicide, depression, and anxiety. More specifically, females are found to be more victimized by stress and anxiety (Toussaint, Marschall, & Williams, 2012). Here religion plays an effective role. Religious commitment guides youth about how to react to things and which things should be attempted. Religion guides the right way to the youth and restricts them from attempting anything wrong (Patel, Flisher, & McGorry, 2007). When the adult feels lonely, depressed, and frustrated, the connection with God heals him/her (Neff & McGehee, 2019). The religious activities, such as offering a prayer or reading the Holy Book, give the impression that God has forgiven the individual, and thus the concept of being forgiven provides peace deep inside the personality. This peace is highly essential because it prevents the person from attempting any unethical or illegal activity, such as suicide (Maltby, Day, & Lewis, 2010).

The studies have shown (Koenig & Larson, 2001; Worthington, Berry, & Parrott, 2001; Dyke, Glenwick, Cecero, & Kim, 2009; Maltby, Day, & Lewis, 2010) youth face a rapid social change in their lives. They are exposed to different biological changes, after which they remain weak in controlling their emotional situation, leading to fewer self-compassion capabilities amongst them (Rye & Pargament, 2002). Thus, in such a situation, the youth remain unable to understand the facts, and accept the things as they are, and thus adopt illegal and unethical way

for the fulfilment of desires (Koenig & Larson, 2001). The concept of self-compassion is very important to understand the psychological condition of youth. Every religion, from Buddhist Philosophy to Islam, guides the individual to understand their realities and accept them as they are (Toussaint, Marschall, & Williams, 2012). The religion guides the person to improve self-control and leave the rest on God. Thus, individuals with strong religion background are found to be having strong self-compassion, which leads to the psychological well-being of the person (Neff & McGehee, 2019).

This simply means that there is a strong relationship between religious commitment, self-compassion, and psychological well-being (Dyke, Glenwick, Cecero, & Kim, 2009). Different researchers have also studied the relationship between these three variables; religious commitment, self-compassion, and psychological wellbeing (Radloff, 1977).

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Review on product derivation approaches in the software product line

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Abstract: Product derivation is one of the most important challenges in the software product line. Obtaining the individual product from the shared software is a costly and time-consuming job. Various approaches have been proposed for product derivation in the software product line in previous times. This paper will review approaches concerning the product derivation in the software product line. This paper will provide a state-of-the-art literature review on product derivation in software line approaches. Moreover, this will be more useful in order to obtain a novel valid feather combination approach for product derivation in software product line.

Introduction

A software product line is a group of software-intensive systems that share frequently organized features designed from a common set of main resources in a prearranged means [1].

The main thing is the set of shared assets that combine all artifacts. These common assets are utilized on sharing based not only for separate usage.

There are two main areas in the software product line: the domain and application engineering. Core assets are associated with domain engineering, which is based on the

standard and varying features in the products. Application engineering is the development of individual products related to reusing the core assets specifically for each product.

Suppose we discuss the product derivation developed with those artifacts belonging to the family of shared products. The term used as product derivation is related to making products from product family software resources [2].

The purpose of adopting the software product line is to increase the business's productivity by reducing the production cost and minimizing the time in bringing the product to the market. This encourages product derivation approaches in the software product line[5].

Product derivation is main thing in the application engineering that address the development of the product from the core assets of the software product line. Hence its said that the product derivation is the process of making the product using the assets of the product software line family. Here we are sharing the image that will describes the software product line engineering framework.

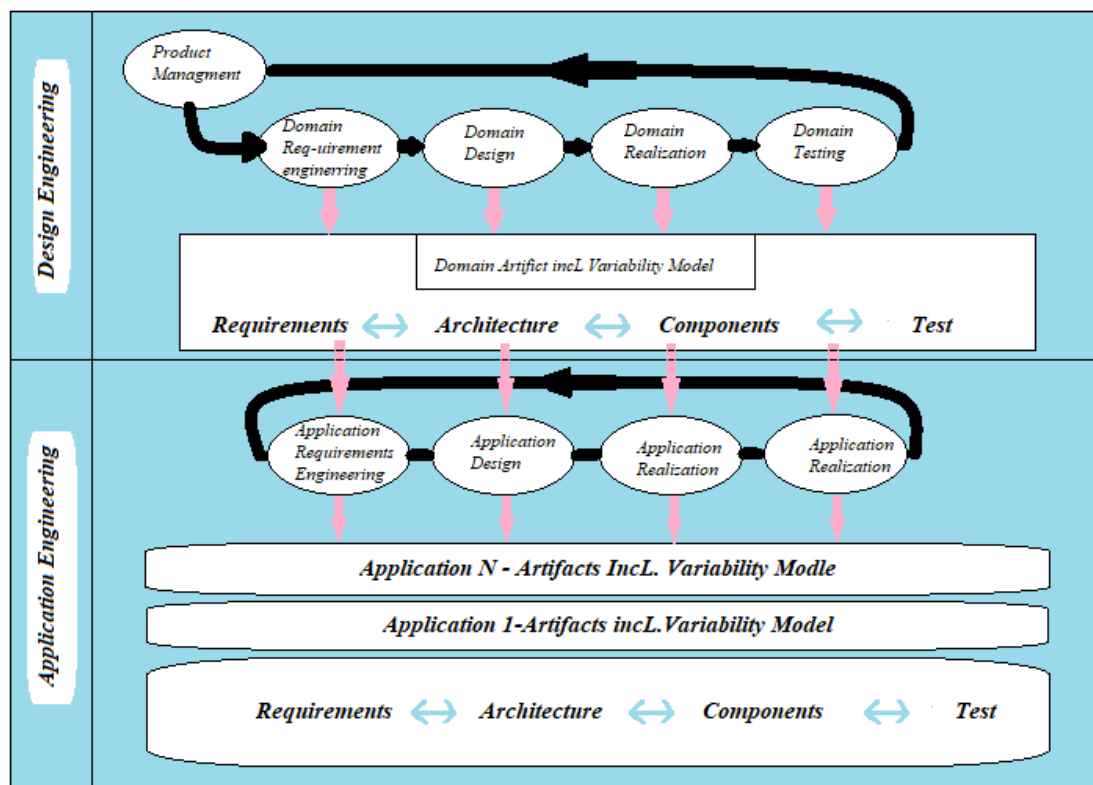


Figure 1: Software product line engineering framework

Now we discuss the main actions for product derivation in software products which are mainly three get ready for derivation, product derivation or configuration, and the

additional development and testing. The approaches for product derivation are always initiated from scratch, and the next step will be features selection and decision making. Overall the observation is needed to be considered these activities, which are affirmed and translated client needs, describe the bottom pattern, map client's needs, describe responsibility and job structure, generate derivation guidelines. Now we have to go for the next step of the product derivation second main activity, which was product derivation or configuration. The primary purpose is to make the product by reusing the product artifacts within less time and low cost by ensuring customers' satisfaction. Mainly two things needed to be considered for the product derivation: the assets selection creating partial product creations. After that, the last critical activity is the product deployment and testing, which is the duty of the creators to execute the product and ensure the changes at the product level. The main things concluded for the product testing, and deployment stage is the part makings and checking, component combination, incorporation trying, and the system testing [3].

The basics of the product derivation framework are two-dimensional classification families and generic software derivation. In two-dimensional families, the primary dimension scope of reuse covers the similarities among the product exploited. Four scopes of reuse are standard infrastructure, plate form, software product line configuration product family. The second dimension is domain scope, representing the main domain and the domain in which predicting family is applied. The second dimension is based on four levels single, program, and hierarchal product family and products population. The generic product derivation process is generalized into a single product family. This is based on two phases, initial and iteration. Initial one created from family assets and iteration arrangement is customized in a quantity of succeeding circulations awaiting the product suitably execute the compulsory needs [20]

This review article is structured as follows: Section 2 gives us the background knowledge of proposed approaches concerning the product derivation in the software product line.

Literature Review

In this part of the article, we discuss the approaches for product derivation in software product lines.

[1] This article developer deals with deriving the software product more automatically and efficiently. An approach represents the set of integrated models specific variability and possible changing options for product variants and the auto running products with changeable models with aspect-oriented techniques. This model is a research prototype which automatically does the important and significant activities. The fundamental reason for this model is to make sure the product derivation is more efficient. AspectJ also has the acceptability with more advance methods more effectively. The AspectJ demonstrates that this model ensures the practice of the more advanced techniques.

[2] People believe that individual products from shared software assets are time-consuming and expensive. That is why lots of efforts concerning the scenario by proposing various approaches for product derivation. This article also proposes research that investigates those issues. They provide the readers with the terminology and concepts concerned with product derivation. Moreover, those issues occurred during the case studies at two heavy industries related to each other, such as comparable or un-mature firms.

[3] This paper presents the two approaches and compares these approaches, which are proposed different projects by different researchers for product derivation in the software product line. Both of these approaches for product derivation independently behave. One is based on the references model, and the second is a tool-supported

derivation scheme. The validation gives proof to facilitate the recognized acts are related to product derivation; we conclude that they are measured as a checklist after making or assessing product derivation methods. Moreover this article also gives the ideas about how to organize for derivation from previous approaches. This leads to concentrate on role and tasks for product derivation stakeholders also guides about creation. Author of this article mainly and strongly focus on interactive nature of product derivation. In results they concludes that product derivation still an costly activity.

[8] This article describes a model used for product derivation that uses some specifications of known customer needs, features, and artifacts using knowledge. This model is based on a logically based representation language that interoperates with a defined model supports the activity in the product derivation mechanism by handling dependencies between artifacts. This model makes the knowledge about the artifact tool-based mechanisms that enable them to of product derivations.

In this article another approach discussed that support human developers and not based on automated software working and its representation is in-fact designed for human constantly rather than for machine understanding. In conclusion making knowledge concerning with features and users needs and artifacts are all automatic derivation mechanism.

In [9] is based on a features realization replica base scheme of product derivation features implementation works as middle level among features model and plan completion. This works to capture feature and cross-cutting relations in the better position stage and facilitate making clear the complex mapping among feature and program execution. Thus, the model and role instantiation can enable feature-driven program-level customization and configuration. Feature-Oriented Programming is

taken on as the execution technology for product derivation on the program stage. Then program-level work of art can be executed by a characteristic merge to attain the character-driven product derivation finally.

[10] This decision model-based scheme for product derivation creates the software product line using model derivation engineering principles. The main program used is the meta-models, and the model transformation, which are the sets of ordered model transformation rules. It obtains actual software artifacts from primary models and uses the feathers model to express the variability included in the software product line. A transformation program was adopted as per choice for features model due to product line members' changeability to derivate a producer-specific configuration and decision model used to link variants to model transmission rule. Hence, the decision model can adopt a transmission program to derivate products and specific variants.

[11] In this paper, a method identified as KobrA proposed incorporates two paradigms into symmetric combined draw near for software development and maintenance. The main thing for their combination includes support and makes their installation more flexible of the variants of the system and justifies their methodological support for component-based framework development.

[12]. In this paper, the argument about the approaches used to develop producer line existing domains. They proposed a product software engineering scheme to make the conception of deployment of software products line to the great diversity of enterprise field.

To achieve the product's major focal point through the phase of PuLSTM, customization of its parts enhances the introductory abilities maturity, structured evaluations, and adaptations.

[13] This article talks about two models: product line engineering and model-driven structural design, which are very important paradigms that are less costly and efficient to develop the applications. PLE is more effective in the reuse of the common assets, and the model MDA is used to develop an application in diverse platforms with model transformation. Vigilant understanding of product line engineering and model-driven structural design make known that they complement apiece other by overcoming their borders. They define a likelihood of seamless incorporation follow-on in a complete marketable level scheme. This article, a realistic product line tactic, DREAM proposed taking on main actions of product line engineering and model transformation characteristic of model-driven architecture. Practicing the proposed scheme makes it achievable to professionally and semi-automatically make many applications that differ on the actions and execution stage.

[14] This article shows the critical feature of variability management in SPL for honest representation of variability. Several experiences do at industries about their software mobility model by software companies. Uniform representation of variation position as initial group unit in all concept layers between features and codes, permitting a hierarchical group of the variability. Moreover, allow for primary group illustration of specific, such as one to one and complicated, and n to m, dependency, another one is to permit for making the connections among dependencies. On the hand, variability modeling methods uphold the initial 2 needs, anyhow not having support for remaining. This paper is a structure for variability modeling and COVAMOF, supporting the fundamental needs.

[15] This article discusses the systematic mechanism that gives a structures model for product derivation in the software product line. This model stands on the set of duties, tasks, and artifacts. The proposed model was identified as a process model for product

derivation (Pro-PD). This model assesses to compare existing approaches to justify its standard. Pro-PD explains the duties, process artifacts, and roles utilized to obtain products from an SPL. Moreover, its can state thus model was developed for methodological support, and it was repeatedly developed and judged with four research levels. The initial step was evidence-based methodology, which is the key point and sign of this product derivation approach.

[17] This approach is known as the resolution-oriented line engineering for effectual use again: users' main configurations which easy developed at dolppers laboratory the purposed of the automated software engineering. This tool-supported approach was able to adopt variability and assist the sale peoples, non-technicians, and application engineering. This approach is named as DOPLERSucon, based on various activities. The first one is the domain skilled get ready product configuration by making the derivation model. Secondly, Users described in the derivation model carry out the simple product pattern by making a choice noticeable. After that, similarly, they Capture begin product's exact needs. Moreover, developers should carry out the extra expansion according to the needs. In the end, engineers put together novel growth with the elected and modified products and organize it for the client

[18] This article discusses the software product line and agile practice that emerged new paradigm in the software makings. The primary aim of these approaches is to improve software productivity, minimize time, reduce cost, and enhance customer satisfaction. The writers of these schemes are trying to research the potential of agile approaches for product derivation in SPL. This article gives a sketch of the proposed agile procedure scheme proposed in the paper for product derivation through industry-based case study research.

In this review paper, all of the approaches in various research papers are appropriately referenced. These approaches have been proposed in previous times and recently taken from the published papers.

Table of comparison

Title	Year of publication	Journal	Customer requirements specifications	Key contribution	Expectations in the end
PuLSE-1	1999	Symposium software reusability	Complete project plan	Deriving product from SPL in an efficient and automated way.	Delivery process as per market size
DREAM	2005	IEEE	Translated customers requirements	A partial product line method that allows the semi automatically development on large features.	Making of executable application code
KobrA	2009	PhD Thesis. Institute of system engineering and automation in John Calper University Linz	Use of decisions models	Two approaches based on incorporate the component and software product line designed for modeling architecture and develop single and family systems.	Final results must be application, component, context decision with app's realization & tree.
COVAMOF	2003	Software variability management	Bounding the unique identities	COMVAF-VF tool used in this approach. It used	Configuration of executable product as

		workshop. Groningen. The Netherlands.		to design the variability model for product family. Binds the variation point based on customer requirements.	require.
Pro-PD	2012	Research gate	Translate customers requirements in to organizational language	Develop generic agile process model to identify fundamental mechanism of product derivation	Satisfying product release.
DOPLER^{ucon}	2009	PhD Thesis, Institute for Systems Engineering and Automation, Johannes Kepler University, Linz,	Creation of derivation model based on decryption and purpose and name.	approach for product configuration with capabilities for adapting variability models to guide sales people and application developing with PD	Installable product delivery.
1-AspectJ	2009	Researchgate	Analyzing the existing issues.	Product deriving from SPL with automated and efficient way.	Derivation of automatic executable products
16- A users centered approach	2009	Thesis at Johns capler University linz / JKU	Collaborating with industrial partners and their feedbacks	Support the stakeholders involve in	Support and help stakeholders

				product configuration and help to handle the complexity of product as per applications diversity	
17- Formal approach for product derivation	2008	Researchgate	Concurrency at software and hardware	A real time application development tool from software product line	High performance real time applications development
18-agile process model	2012	Researchgate	Industries base case studies.	This article present the outline of product derivation with agile process	Improve productivity. Reduce product cost and time to market.
Visualization techniques	2007	Lero	Not discussed briefly	Examining the visualization techniques to support the product derivation in SPL.	Support and improve the variability management and product derivation.
22-quality based heuristic-PD approach	2015	Researchgate	Architectural design for product deviation	derive an optimal solution From weights assigned to architectural choices based on this information and clients needs.	Enabling the product derivation process from RA

27-Asset based approach	2006	IEEE	Difficulty in selection of desired assets.	This enables the derivation of product theory evaluating the assets in various ways.	How to use asses to makes product.
30-validation of multimodal approach	2011	Springer	Requirements of architectural architecture.	Multi model approach for derivation and imporvements	Quality driven product architecture
2- Features extraction approach	2015	Elsevier	Lacks of knowledge in readers about product derivations	A case study tto inform the users about product derivation mechanis in more effective way.	Providing knowledge to the readers about product derivation
DSL based approach	2016	ACTA INFORMATICA PRAGENSIA	Dealing with those factors which are directly involves with time and cost factors.	DSL based approach integrate the SPL and model driven engineeringto takes thebenefits of both of these.	Modeling the variability model and Development Time reduction

Conclusions

Product derivation is a central issue in software product derivations occurs that deriving the individual products from the shared software assets is time-consuming and costly. It's necessary to develop software with low cost, time-consuming, and more effective and satisfying customers.

This paper presents the approaches reviewed in the literature for product derivation in the software product line. These approaches are proposed by various authors in previous times that have numerous positive and negative aspects. We have discussed then in the

paper with short decryption. After this we have made a comparison table of these approaches in various contexts. These approaches are discussed in detail and generate a research question to develop a novel approach for the product derivation in the software product line.

The literature review can perform in the future by including more papers and grouping these approaches based on similarities.

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Impacts of Solvency II Regulations on the Insurance Companies and their Operations

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Abstract

To run a market smoothly, regulations are very important. These regulations worked as set of parameters for all business operators, managers and their key stakeholders of a specific domain to work under certain rules so that every business has equal opportunity to earn and expand their operations. In Europe since mid of 18th century several legislations were introduced to regulate the market to protect the rights of investors, business and their stakeholders and also to create a free and fair market for all. Insurance companies and their managers were facing a problem with dissymmetry of information which means that they either they do not share important information to each other or either the access to the information was a way costly for them. There was a need of monitoring the economic activities and setting certain requirements for licensing. Regulations, ethics and rules were being introduced since 1800s. after the mid of 20th century, a series of regulations were introduced to regulate the insurance market in Europe according to one market policy and from this series the latest regulations implemented in 2016 are termed Solvency II regulations. Solvency II regulations introduced new risk based economic capital requirements that can affect corporate financing and capital markets across Europe. On the other hand, there are no limitations applied through Solvency II to the market risk that is why it is safe to state that it will not influence the strategies of insurer companies. This paper will review the impacts of solvency II regulations on the insurance companies and their operations.

Introduction

The core reason for regulating is to correct imperfections, lowering or solving the cost information issues and solving the agency problems such differences between management and policy makers, this problem arises because of nonalignment of the information between them. Acquiring such information has certain cost. To resolve these issues, several regulations were introduced for 200 years for disclosure and sharing of information, supervising and monitoring the capital requirements and licensing process.

During the 1970s some rules were introduced by member countries of the European Union in order to regulate the insurance companies and in 2004 new regulations were proposed in order to meet with the requirements of a new single European market while the current Solvency II regulations were formally incorporated in European countries in 2016.

Primary objective of the European Union is to create a common single market for the member countries and Solvency II regulations were proposed to improve the process to supervise the regulations in the region. When originally introduced the regulations of 1970s and their updates were termed as insurance directives, they primarily focused on the coverage, licensing and relationship between regulators and supervisors while offering the product to the whole Europe.

In 1990s it was felt that framework is outdated while at the same time Basel II regulations were being introduced in banking, steps to improve the regulation of insurance were taken by the union. A two-step approach was proposed and termed as Solvency I regulations which replaced the old 1970s insurance directives and was implemented in 2004 but the original structure remain the same whereas, Solvency II changed the structure and supervision process of the regulation in the Union.

To improve the several other regulatory rules, aligned with the Solvency II were also initiated. In United Kingdom the Internal Capital Assessment Standards (ICAS), Solvency Test in Switzerland (SST) financial Assessment Framework (FTK) of Netherlands. Eling and associates analyzed several solvency systems (Eling et al. 2007). International Association of Insurance Supervisors (IAIS) also initiated several programs to improve the solvency frameworks. Among all these Solvency II stands

distinguish because of the two reasons. First, it is not principles rather it is proper legal set of regulations and secondly, because of its implications as it is applied to a larger market. These regulations framework is based on three things, first financial requirements, insurance liabilities and assets, 2nd is supervision and third is maintaining the discipline in the market. The first pillar capital requirements consisting of valuation of the balance sheet, market consistency and assets and liabilities. This also further more requirements, one is Solvency Capital Requirement (SCR) and other is Minimum Capital Requirement (MCR) the upper value solvency Capital Requirement is calculated through a standard approach when lower value of minimum capital requirement is violated the supervisory came into action according to the Solvency II article 136. Through this, Solvency II regulations protects the interests of policyholders.

International Association of Actuaries indicates that there are four major risk classifications of the standard internal model, i.e. SCR first underwriting risks second Credit risk the third is Operational risk and the forth is market risk which is further subcategorized different classifications along with the formulae which are twenty in total.

Solvency II regulations, Critical analysis

The greatest regulatory reform in Europe for insurance company came into light with the implementation of capital risk-based Solvency II regulations this can impact the insurance companies in various ways especially their investment strategies because these regulations requires the asset allocation for market risks. Michel Barnier, European Commissioner for Internal market and services in a letter to insurance industry said that the there is a heavy criticism on these regulations that the standards set in these regulations are unnecessarily high is not true. With the introduction of similar risk-based capital standards in the United States back in 1994, similar questions were raised, when Petroni and Shackelford pointed out that there is no response to the asset risk component of risk-based capital while they examined extensive data of life insurance companies in the United States. Capital requirements in Solvency II raised prospects and fears among the market stakeholders as it was indicated in the committee on the Global Financial System (CGFS) that according to the new risk charges there might be a need of rebalancing the asset sets of insurance companies.

Commins Criteria

Commins et al. (1994) develop a formula based on seven points and following is the critical analysis of the Solvency II regulations based on those seven points which revolves around the core idea of a competitive market where relevant information could be accessible for every stakeholder. Doff, (2008) analyzed data from 1969 to 1990 of around 300 insurance guarantee fund assessments from which about 80 percent of the total were caused by 25 largest failures this indicates that the larger companies contain the higher potential for bankruptcy than of the smaller ones.

Increments for small companies

In the Solvency I, there were no incentives discussed hence significant risks were ignored and ultimately disturb the good risk management. But in the case of Solvency II regulations, a system of SCR was introduced in which with higher SCR values for the companies with higher risk profiles. In the Solvency II there are no extra incentives given to the financially weak companies but every company is encouraged to take steps to eradicate the risks and value the liabilities through economic rules. Ultimately it appears in Solvency II regulations that there is difference in risk for different companies according to their exposure size, scenario etc. hence, it is specific on risk and risk sensitive approach. These components which are based on scenarios create the right incentives for the weaker companies through reducing the exposure to risk and by improving their position.

The companies using internal models normally assume the risks correctly because these models are aligned with the management and company policy and process that ultimately decreases the problems for company. Whereas standard approach does not create proper incentives for health and non-life financially weak companies as indicated by Sijben (2002). Numerous stakeholders argue about the role of supervisors about the hard limit value if the SCR is breached by a company, there is also another question raised by the stakeholders that whether this breach always must be public or a temporary breach can be kept private between supervisor and the company. In the Solvency II regulations, capital is assumed to work as a buffer to absorb any uncertainty or capital risks and when there are too strict supervisory actions taken in case of breach in SCR can result injustice incentives that is why SCR is used as target value and it has

support with Pillar II. In nut shul these regulations contain equal incentives for weak and strong companies but their capital reaching to SCR creates different behavior hence this makes a difference for weak companies that is why we can state that these regulations comply with the first point.

Reflection of major types of risk

In the risk-based capital framework it is important to cover all types of possible risk factors because supervisors cannot differentiate the financially weak companies from stronger ones if the financial requirements are not risk sensitive. This is also indicated in the Sharma Report (2003) they critically analyzed several insurance failure cases and indicated that financial problems are not caused by a single problem but they came out because of multiple interconnected problems and secondly, the capital requirement are less important rather internal controls and corporate governance play more important roles in success or failure of a company. In solvency II regulations there are financial requirements for market, underwriting, credit and risks. All of these risks are extensively discussed in the Pillar I of these regulations. Liquidity risks are not discussed in the Pillar I because there is no proper method to measure this risk and secondly, these regulations focus on solvency position rather than the liquidity position however, in Pillar II this risk is addressed. The next type of risk is operational risk, which is also a debatable because there is difference of opinion on how to measure the operational risk. Method for measuring the operational risk in these regulations are comparatively simple based on premiums and technical provisions. Ven den Tillaart, (2003) concluded that complex calculations are not useful to predict the operational loses and in the all three Pillars of solvency II these are addressed through a simple formula.

Kuritzkes and Scheuermann (2006) indicates the strategic risk and also mentioned that this type of risk is not a direct matter of concern for the supervisor instead it is the other stakeholders such as shareholder who are directly concerned by this type of risk but the Sharma report (2003) suggests that business risk is a matter of concern for the supervisors because the wrong decisions usually led a company towards its failure. Doff (2006) mentioned that other methods and tools to address the business risk will be more useful rather than through the financial requirements. Overall, we can say that these regulations address the major risks through extensively addressing the capital

requirements and hence the Solvency II framework turnout to be a the most logical and comprehensive method to address the risks.

Impact on overall risk of insolvency

Third criteria suggest that the burden of capital weight for risks must be in proportion to their overall impact. In Solvency II, internal model and standard approaches for SCR both requires insurers to keep their gross capital value at risk at 99.5 percent, hence we can say that this overall covers the third criteria to minimize the insolvency risk at the minimum level. Along with this, there is a need to set the parameters carefully because too high standards require higher capital.

Impact on overall risk of insolvency

According to Commins et al. (1994) a good capital-based system should have an ability to identify the companies to impose higher costs of insolvency this is because the failure of larger companies effects the economy on higher level and from the regulator perspective, the objectives are limited to minimizing the failure costs rather than overall risk. In the solvency II regulations, QIS2 for standard approach contains a size factor which unveils that there is a lower capital requirement for larger companies that clearly reflects that on this point, these regulations are not meeting with this criterion.

Reflection the economic value of assets and liabilities

The Solvency II regulations concentrates on market consistent estimation of assets and practical supplies. In Sharma Report (2003) they indicated risk sensitive financial requirement and market consistent systems are supported by the insurance industry. If the market consistent techniques for insurance liabilities that will not meet the measurement of balance sheet for IFRS hence this criterion is not satisfied so as a result, Solvency II could adopt the IFRS as valuation.

Discouraging the underreporting of loss of reserves

In Solvency II the issue of underreporting, loss of reserves and several other ways through which companies manipulates the market and their stakeholders is discussed briefly. In the current times of corporate frauds incentives should be minimized for the

companies for misreporting. This subject is related to corporate governance on site monitoring which is added in Pillar II.

Avoid complexity to increase accuracy in risk measurement

The complexity in any economic or account system may increase the possibilities of its failure. It is also noteworthy that a complex system normally is not accepted by the stakeholders and its users. In case of Solvency II regulations this system is widely accepted and even desirable for regulators and supervisors. Capital requirements, supervision and discipline in market and option for using internal model is a well appreciated framework. In order to comply with these regulations' insurance companies will have to fulfil certain requirements.

Impacts of Solvency II regulations on European Insurance Companies

Various studies about risk-based capital requirement regulatory on insurance companies suggested that there is no restructuring needed for insurance companies in response to comply with the rules and regulations set by risk-based capital requirement regulations (Petroni and Shakelford, 1996). Whereas Cheng and Weiss (2011) in their study found that financially weak companies dealing with property and casualty are tend to acclimatize according to the new regulations.

Multiple studies were conducted for finding the impacts of Solvency II regulations on the investment strategies and polices of the companies of Europe. Rudschuk et al (2010) stated that these new risk-based capital requirements will force the companies to decrease their equity exposures. Van Bragt et al. (2010) found that there is a key effect of duration and allocation of assets on regulatory capital requirement. Jaffee and Walden (2010) indicated that these new regulations have a marginal long-term effect on cost and availability of capital but these regulations may cause a huge burden of cost on the insurance companies that may reduce the demand of policies as a result of higher cost of premiums.

Kaserer (2011) in his study suggested that European insurance companies will reduce their long-term corporate bonds with lower credit quality. He argues that there is large level impact of restructuring the portfolios of insurers. This can increase the financing cost resulting slowing down the economy. He supported his arguments with an evidence

that with the reports of implementation of Solvency II regulations, stock prices of insurance companies were decreased to overall 15 percent. Al-Darwish (2011) also indicated that there could be increase in investing in EEA sovereign debt and short dated maturities that can lower down the issuance of long-term unsecured debt by banks.

Morgan Stanly and Oliver Wyman (2010) also found a shift from equities and illiquid to short term corporate bonds they also indicated that for non-life insurers rating capital is still vital component. Fitch (2011) in his study also indicated a great appeal for short-term corporate bonds and great influence of capital requirement on investment strategies.

Conclusion

Recent studies suggested that in response to the increased market pressure may lead the insurance companies to hold some excessive capital then the SCR up to 50 percent in because of Solvency II SCR requirements. The real financial risk is not mirrored via zero credit spread risk capital charge for Europe Sovereign debt and because there is a requirement of recognition of credit spread risk in Solvency II regulation it also creates an uncertainty between Pillar I and Pillar II. There is unadorned effect of debt crises on the insurance industry of Europe. Banking debt, worse macroeconomic conditions, fall in prices of equity and decline in interest rates are few of several serious intimidations faced by insurance companies in Europe. But there is no significant impact of Solvency II on capital investment policies. However, after facing the severe debt crises some European insurance companies may change their underwritings and investments in order to secure the ratings and regulatory solvency.

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A Review Paper on: Benefits and Challenges of DevOps Developer and Modern Era

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Abstract

DevOps is the well-known modern methodology that most organizations used to optimize their business for better production and updated software. Nowadays, DevOps get popular due to many benefits such as Faster Deployment, Enhance the Entire Business, Optimizing the Software Quality, Stable Work Environment. Increase in Automation Efficiency, Improvement in Product Quality, Speed and Stability with Continuous Software Delivery, Less Cost of Production, Quick & Reliable Problem-Solving Strategies, and Teams Unity for Faster Production. To provide these benefits, the DevOps cycle plays an important role.

On the Other hand, DevOps Implementation and adoption also come across some challenges. So, the association that wanted to adopt this methodology in their companies have to tackle these challenges. Common challenges that we studied during

the review articles are Toolset Clash among Dev & Ops, Difference between the Dev and Ops Mentality, Moving from Infrastructure to Microservices, High Focus on Tools, Opposition to Change.

INDEX TERMS DevOps, Modern Era, Benefits, Challenges, DevOps Developer, Modernization, Tools, Development, Operations, Methodologies, techniques, DevOps Cycle

1. INTRODUCTION

In this modern era, as we know, the popularity of technology is rapidly increasing day by day. So, organizations are always ready to look forward to new methodologies and ways to enhance their earnings and make their software better. As undoubtedly, every company utilizes various software in running business operations [1]. Therefore, the term DevOps Developer came into view. Significantly, the term “DevOps” is a mixture of two words, ‘development’ (dev) and ‘operations’ (ops). “DevOps” is an administrative procedure that promotes faster development of applications and effortless maintenance of ongoing deployments.

It is the combination of techniques and tools or cultural philosophies that are classified to increase an organization’s capacity to provide applications and services quicker than established software development methods. It's like a team of developers that work for the company's benefit to solve various challenges by improving products at a faster pace and infrastructure of administration method. Besides, speed helps associations to serve better their clients and compete more efficiently in the market [2]. DevOps promotes shorter, more controllable repetition with the adoption of best procedures by allowing organizations to build stronger bonds between Dev (developers), Ops (operations) and further stakeholders in the company for automation and new tools.

After the DevOps methodology came into view, the Agile and WaterFall methods were wiped out that were raised before for developing software or products. The main difference between agile and waterfall methods is that “Waterfall” is a linear process of working that needs the group to meet each project stage before proceeding on to the next one. On the other hand, “Agile” boosts the team to work simultaneously on distinct areas of the project. However, both Agile and WaterFall methods became part of the past after the advancement of the DevOps methodology to complete the need for

development and betterment [3]. Moreover, the DevOps expression seeks to minimize the ‘system development life cycle’ and bestows the continuous delivery and high quality of software. At the same time extending the reliability, stability, safety, and flexibility of the creative environment [4].

2. IMPORTANT OF DevOps DEVELOPERS IN MODERN ERA

As we discussed above in the introduction of this review article, DevOps signifies the two teams work jointly to increase the reliability of operations and the productivity of developers. Also, it is important for the development of the new products or to maintain the existing deployments in companies. Plus, the rate of adoption and importance of DevOps is significantly increasing from 2015 to 2016, according to DevOps.com [5]. Therefore, in this modern era, the demand for the DevOps methodology is high than others, such as Agile or Waterfall. Because every company wants to improve their software and products with high quality.

2.1 Who is Taking Advantage of DevOps in Modern Era?

Over the last decades, DevOps is responsible for transforming business standards and also raising competition leading to a sky-rock interest. No doubt, in the modern era, the demand for DevOps engineers or developers is high; however, not every company can afford this kind of methodology.

Initially, DevOps was used by huge organizations [6] that are still successfully using this method, such as Google, Amazon, Netflix, Etsy, Target, NASA, and Hertz. Undoubtedly, these organizations have caught conquest in their DevOps transformations. Nowadays, the use of DevOps can be detected in three basic [7] groups of adopters that are all tested by the fast-expanding speed of service discharges.

1. One those who are early experts of light-footed programming modification methods and are trying to the organization to International Journal of Computer Applications (0975 – 8887) Volume 180 – No.48, June 2018 17 coordinates the rapid speed of programming innovation. The run of the mill discharge speed in these companies varies from month to month instead of every day. An unremarkable purpose of premature professionals is to wipe out modification

work-in-advance adjournment forced with the help of testing and operational discharge.

2. Second, are the Web-scale specialists, which acquire DevOps to achieve multiple mini-scale discharges for an application in a day. They work on the Motto, "Analyze and move forward."
3. While on the third, we get the Traditional IT companies operating in fixed and regularly required to businesses. For example, back have managed discharge hones.

Consequently, above three gatherings share a few goals that are following:

- I. Disposing of the time and asset limitations of utilization conveyance.
- II. Ensuring the quality, soundness, and constant change of their discharges and the knowledge for their end clients.
- III. Make the essential contrasts between the gatherings in light of the business and nature of the administration that is driven by the repetition and size of use discharges.

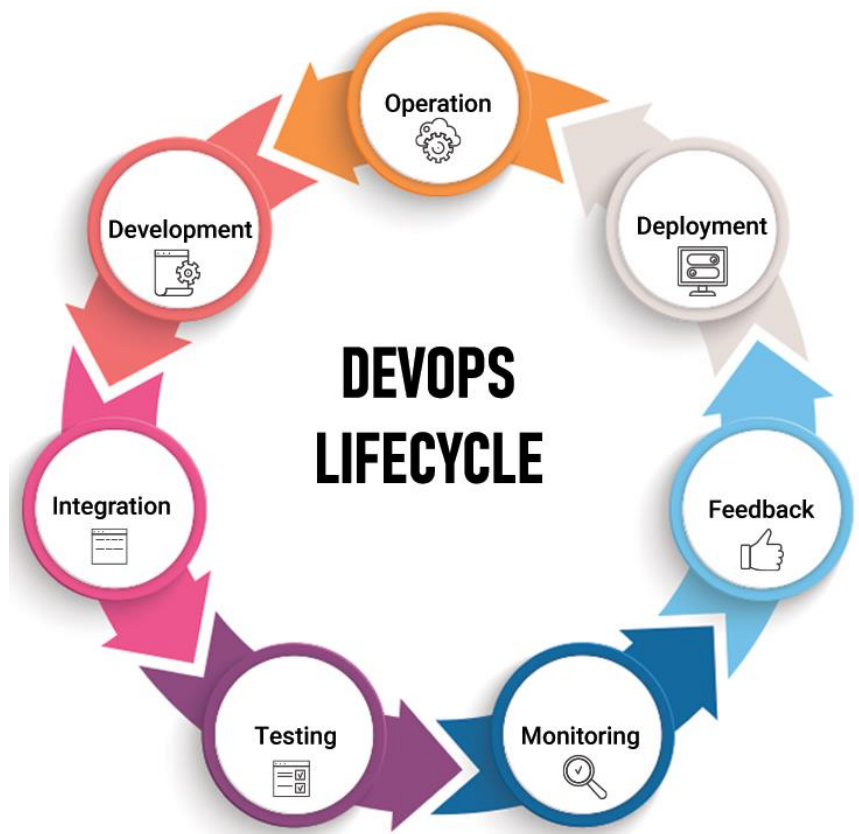
3. WHAT IS THE DevOps CYCLE?

When we talk about the “DevOps”, its Cycle is most important that is based on different stages. Generally, these stages involved in the DevOps methods show users from development to deployment and monitoring. It delivers a standardized system to combine DevOps techniques into your delivery pipeline to improve the speed and dependability of the delivery procedure.

3.1 Stages of DevOps Cycle

Mainly, the DevOps cycle has seven stages that are following:

1. Development
2. Integration
3. Testing
4. Monitoring
5. Feedback
6. Deployment
7. Operations



To better understand the DevOps life cycle, here we discuss each phrase precisely that helps you to know how this cycle works.

1. **Development:** Significantly, in the DevOps Cycle, the first phase or the step is ‘Development’, which is based on the coding and planning of the software. Basically, this step divides into two parts: planning and coding. In the first part of planning, the vision of the project is decided, for which you do not need a specific tool. On the other hand, the second part is coding, for which different kinds of tools are required to maintain the code after or during the development. Moreover, this maintenance procedure of code is known as “Source Code

Management.” Whilst Git, VN, Mercurial, CVS, and JIRA tools are popular that are used in this phase.

2. **Integration:** The Second Phase of the DevOps Cycle is 'Integration', which is known as the heart of this cycle due to its software development practices. In this phase, experts need to change the source code more frequently on daily or maybe weekly terms. Plus, building new code, also includes code review, testing and continuous integration. Hence, the updated code requires to be integrated continuously and smoothly with the systems to mirror changes to the end-users because of the continuous development of software.
3. **Testing:** In this stage of testing, already developed software's tested continuously to detect any kind of bugs. In this process of continuous testing, various automation testing tools such as Selenium, TestNG, JUnit, etc., are used. These tools ensure that the functionality of the software must be flawless and bug-free.
4. **Monitoring:** As its name shows, 'Monitoring' is the process in which the performance of software and applications is continuously monitored. All the crucial information about the use of the application is recorded in this monitoring phase which helps you to know the right functionality of the software. Moreover, in this phase, the root cause of any problem is detected and maintained the security. Besides, this step makes sure the availability of services, resolved the network problems or automatically fixes the issues as quickly as they are detected.
5. **Feedback:** In the DevOps cycle, 'Feedback' is also a vital phase in which developers and all the experts give their feedback about the uses of software and the applications. With the help of this step, experts can better understand the flaws in coding and improve software and applications. Overall, Feedback is important to keep better updates in future for products and applications.
6. **Deployment:** In this process cycle, the sixth phase depends on 'Deployment', where the code is deployed to the production servers. The important thing in this process is that the code should be correctly deployed on all the servers. Meanwhile, continuous deployment lessens the risk of the specific deployment failures or if any case of failure, you can quickly go to the back of the previous version.

7. **Operations:** The last step of this DevOps cycle is 'Operations', which depends on the harmonization with the entire robotization of the delivery cycle and enables the association to fasten the general possibility to promote repeatedly. Mainly, the operations highly depend on monitoring to understand the health of the application and ensure that functions of applications are reliable throughout the process of operations. The duty of keeping the application is specially related to the operations team. Nevertheless, it can extend across to other teams in an issue such as a bug needing numerous workers to develop, test, and deploy the fix.

In short, the DevOps life cycle is a complete process of seven phases in which various tasks performs by the team of developers and experts accurately. With the help of this cycle, the organizations are able to check the continuous assessment of applications and software, detect and remove bugs, improve the flaws and do frequent updates to the latest versions. Consequently, you get the outcomes of high speed, the velocity of delivery, and improvement in stability and quality. Plus, the capacity for efficient work will be increased.

3.2 CAMS: The Core Values of DevOps Cycle

Apparently, this cycle of DevOps relies on the four core values that are Culture, Automation, Measurement, and Sharing [8]. Therefore, it is called “CAMS.” So, in this era of digitalization, the DevOps cycle for the betterment of IT development depends on the CAMS values [9].

Culture: Generally, the purpose of the culture in the DevOps cycle is to create a bond between team or groups that belongs to various cultures. It helps to create unity among them so they can do their work as a single entity.

Automation: During the DevOps phases, automation is also an important factor because it helps to improve the productivity and the workflow of the organizations. Besides, it eliminates various human errors and is able to fix them without any delay.

Measurement: The core value of the measurement is also vital because it monitors or tracks the progress of numerous activities that are performed during the DevOps Cycle, such as it measures multiple metrics to increase performance and productivity.

Sharing: Mainly, the success behind the team of DevOps is sharing the tools, knowledge, experience and discoveries among the team members. Consequently, in this DevOps cycle, sharing has many benefits.

4. BENEFITS OF DevOps DEVELOPER IN MODERN ERA

Undoubtedly, in this era of digitalization, the DevOps approach is the best to enhance the production quality, advancement in software and workflow of the organizations by getting the help of IT developers. Therefore, in the modern era, the concept of DevOps methodology gets popularity in a blink of an eye. Like all other things, the review also found that DevOps has numerous benefits that are why the world's top associations, such as Amazon, Google, Netflix etc., adopt this method [10] [11].

There are primary benefits that you get in this modernization because of DevOps techniques which allow you to move ahead in the competitive market and become more systematic.

1. Enhance the Entire Business

The first biggest benefit of the DevOps methodology is to help you to enhance your whole business. System architect Patrick Debois, who is well known as the creator of the DevOps movement, says the great benefit of DevOps is the understanding it provides, which forces associations to "optimize for the whole system," to improve the business as a whole [12].

2. Optimize the Software Quality

Significantly, the DevOps techniques help you to optimize your software quality and remove the flaws [13]. No doubt, the team of DevOps developer work together to improve the application and software quality to boost the business and the productivity of the organization so it can work quickly.

3. Stable Work Environment

When you want success, the environment of the organization is the most important thing. So, the DevOps practices provide you with the benefit of stabilizing the work environment with a well-balanced strategy for operations [14].

4. Increase in Automation Efficiency

According to Robert Stroud, “DevOps is all about the fueling the business transformation” that depends on the phase of people, process and a culture change [15]. Therefore, with operating engineering functions end to end, DevOps underlines deploying software more often, reliably and securely via automation.

5. Improvement in Product Quality

Another benefit that you come across while using the DevOps strategy is the betterment of product quality. Mainly, in DevOps, the team of developers work together to make the production of the organization better than before.

6. Speed and Stability with Continuous Software Delivery

DevOps method in modernization allows associations to meet the fast speed of the technology. It also helps to stabilize the software. Besides, the experts’ team in DevOps make sure the continuous updates of the software improve its speed and working. In short, DevOps ensure both speed and stability with continuous software delivery [16].

7. Less Cost of Production

While using the DevOps methods, you also get the benefit of minimum cost of production. In DevOps, complete teamwork helps to cut down all the production and management costs because both maintenance and new updates are brought beneath a single roof.

8. Quick & Reliable Problem-Solving Strategies

One of the primary benefits of DevOps is the quick and reliable problem-solving methods that help you to remove all the errors and bugs instantly. Plus, the team of DevOps can solve all the technical errors in software management. So, the work will

be done without any fear and with full confidence that errors will be detected immediately [17].

9. Teams Unity for Faster Production

Undoubtedly, the unity among the teams is very important in any organization for better and faster production, and only DevOps provides you with this facility in which teams work with complete collaboration and trust.

10. Faster Deployment

One of the best benefits of DevOps for both customers and organizations is the faster deployment [18]. Indeed, faster and frequent delivery of updates and features satisfies the customers as well as improves the standard of your company in the market.

4. MODERN ERA CHALLENGES OF DevOps

In the modern era, where you get numerous benefits from DevOps, its implementation and adoption face several challenges as well [19]. Therefore, during the review article, we highlighted a few challenges that probably associations faced. Generally, the primary challenges in DevOps found in this digitalization era are five that are given below [20]:

1. Toolset Clash among Dev & Ops

One of the challenges that face DevOps is the toolset clash, between Dev and Ops tools because both have entirely different toolsets and metrics. Therefore, DevOps teams have a problem while using the tool for development and operations.

2. Difference between the Dev and Ops Mentality

Another challenge of DevOps in this modern era is the mentality difference between dev and ops. To get overcome this problem is a great challenge for organizations; however, to understand the importance of the DevOps mindset, the design of a social-technical system is required [21].

3. Moving from Infrastructure to Microservices

Because of advancement, the older infrastructure and applications could be problematic. Therefore, it is a challenge for DevOps to move from code to microservices, and it takes time to implement.

4. High Focus on Tools

Another Challenge for DevOps is the high focus on tools. DevOps depends on a combination of tools to make an SD pipeline. So, the integration of those tools can establish complex and difficult maintenance problems.

5. Opposition to Change

For most people, change is scary. Hence, DevOps face the challenges of revolution in current development that can help to solve problems.

6. Conclusion

In the end, we concluded that in the modern era, DevOps has many benefits with a complete cycle of work. Moreover, it faces challenges as well that varied according to the different situations like challenges to implementation, adoption or scaling. However, the primary challenges that DevOps face nowadays are five that are important in all aspects of implementation and adoption.

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Marriage Culture in Pakistan in Relation to Jane Austen's Pride and Prejudice

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Abstract

This research paper attempts to study and interpret the concept of marriage in Pakistan with respect to Jane Austen's narrative work, *Pride and Prejudice*. The novel under study has a major influence on our conception of marriage prevailing in our contemporary set up. There are five various sorts of marriage depicted in this novel, each of which has its own unique characteristics and preferences. In Pakistan, it is possible to find these kinds of weddings which make this study relevant in the intended context. This study aims to connect Austen's ideas on different types of marriage on the then society with the traditional views on marriage in the current scenario of our own contemporary context. In this way this paper presents a useful comparative analysis to highlight the idea and set conventions related to wed lock along with the potential of Jane Austen work to highlight the marriage culture of Pakistan in contrast to the original setting of the novel.

Introduction

1. About Jane Austen

Jane Austen is a well-known English author. Her works have been adapted for television, film, stage, and radio. This feat is all the more impressive keeping in view that she only wrote six complete books (Schneider, 1993). They were *Sense and Sensibility*, *Pride and Prejudice*, *Mansfield Park*, *Emma*, *Northanger Abbey*, and *Persuasion*. Austen is known as pure novelist. She accurately critiques rural culture within the constraints of art. Her life's events and people inspired her. She expresses her own views on the world through her fictional narratives. (Weinsheimer, 1972).

Jane Austen's works contain excellent domestic comedies. So her friends are mostly from the middle and upper classes. Her satire focuses on human relationships. Jane Austen's work is centered on love and marriage. In her books, a young lady falls in love with a wealthy and attractive man (Solomon, 2000). Getting married will be difficult for her but it all works out. Austen opposes illicit love. Only marriage can end a romance. She believes that a couple's ability to get along is essential to a happy marriage. According to her views a husband and wife are meant to be spiritually complementary to each other. A lovely friendship is the bedrock of a lovely marriage. Without it, marriage is a sham as depicted in '*Pride and Prejudice*' (Ashton et al., 2012).

2. About *Pride and Prejudice*

Jane Austen's novel is set in rural England in the 19th century and focuses heavily on the Bennet family. It had five sisters, all of whom had distinct personalities. Mrs. Bennet's primary goal in life is to see her five daughters married off. First-born Jane plays down Charles Bingley's interest in her during the party, but it's clear that he's drawn to her (Peter, 1978).

Darcy, Bingley's best friend, would not let him marry below him. When they meet at a local event, Darcy expresses his displeasure with the whole arrangement. Collins arrives soon after, hoping to marry one of the Bennet sisters. (Rubinstein, 2014). As a result, Collins marries Elizabeth's friend Charlotte Lucas instead of proposing. Elizabeth meets George Wickham, a handsome military man. They are

attracted to each other when Wickham tells her Darcy denied her inheritance (Ganjoo, 2013).

When Bingley suddenly leaves for London, Elizabeth concludes that Darcy is endangering Bingley and Jane's relationship (Wiesenfarth, 1984). Darcy, on the other hand, grows fonder of Elizabeth. Darcy eventually proposes to Elizabeth, but she declines. If Darcy asks for an explanation, Elizabeth tells him he's trying to hurt Jane and Bingley's relationship.

Darcy tells Elizabeth in a letter that Jane is not in love with Bingley. Wickham reportedly sought to marry his 15-year-old sister after wasting his wealth. Lydia, the youngest Bennet, soon marries Wickham. Elizabeth is afraid that even this will tarnish the Bennet family's reputation. Wickham then secretly persuades Darcy to marry Lydia. He also invites Bingley back. Bingley marries Jane, and Darcy proposes to Elizabeth. This time she agrees (Moe, 2016).

3. Research Objectives

In the context of Pakistani marital culture, the following study objectives have been created by a detailed textual examination of Jane Austen's *Pride and Prejudice*. This paper aims:

1. To conduct the study of Jane Austen's *Pride and Prejudice* in contrast with Pakistani culture.
2. To sum up, its universality and application in the cultural setting of Pakistan.
3. To draw conclusions on whether or not Jane Austen's *Pride and Prejudice* can be applied to Pakistani culture.

4. Research Questions

As a researcher I have attempted through this research to provide answer to the following question pertinent to this study in terms of marriage and Pakistani society:

1. What is the potential of Jane Austen's *Pride and Prejudice* to highlight the marriage culture of Pakistani society?

5. Significance of the Study

Due to its emphasis on Pakistan's current marital challenges, this study is important for a variety of reasons. As described in the chosen book, finding a partner for the daughter who is financially secure is a major concern for this family. The major goal of this study is to raise public awareness about the social determinants that lead to a rise in the prevalence of materialism in personal relationships and in society at large. This study makes a significant contribution to the study of Jane Austen's work and to the critique of it in our own cultural setting.

6. Delimitation of the Study

This study does not make an exemption for delimitations. The following are a few of the in-hand research's limitations: The majority of humanities and arts research is qualitative, focusing on the characteristics of the resources via an interpretive lens. Using a qualitative technique, the current study exemplifies the thesis statement's main points. There are two ways in which this study's findings might be generalised: quantitative or qualitative. Quantitative studies are restricted in scope, while qualitative studies are more open-ended. In addition, just a few concerns particular to Pakistani settings are addressed and held responsible in the research's restricted application and breadth. In spite of the concentration on *Pride and Prejudice* in this study, other works by Jane Austen also deal with contemporary social themes.

7. Framework of the study

Using the descriptive approach, the text of *Pride and Prejudice*, which is considered the key resource for this study, is examined in the preliminary research process. An in-depth textual study of the whole document is conducted in order to pinpoint relevant sections that reflect general cultural themes. As part of analysis, we compare the then conventions of the time depicted in the book to the current scenario to see how well it fits the setting and how it handles marital concerns of the two different cultures. I attempted to look for parallels, contrasts, and similarities along the way to

establish worth and utility of the work with respect to our own cultural norms related to marriage.

2: Review of Literature

Morrison, (2009) says that Jane Austen is a great "authoress of marriage and inheritance." According to Welsh (2007), "she was a spinster all her life and died a spinster." She "seems to have had a lot of experience with the perils of all attachments."

Cartmell, (2010) thinks that "Jane Austen wrote [all her] novels about marriage, and most of the commentary and moral discussion is focused on how to make a good marriage and how to make the one good marriage that stands out from the rest of the novel and dominates it. It's true that marriage is a social agreement, so it has to be thought about in the public eye (Morris, 2014). Most people think that people will have the marriages they deserve after reading this book "and that Elizabeth will get married when she solves all of her problems (Austen, 2017).

According to Klinger (2017), It is one of the few big mistakes we can lay at James's door. "Jane Austen," he said in one of the few big mistakes we can lay at his door. "She was instinctive and charming." Further, he talks about Austen's writing that she did not just show how a society looks, but also makes it come to life in a subtle way.

According to Ellingsen (2008), she is, in fact, the kind of writer who needs the support of society, as well as its ability to create standards of living that are good enough to measure lives by, to bring her fictional world into being. At the same time, her fictional world also makes that society possible."

1. Research Methodology:

This study's methodology is essentially qualitative, using a descriptive technique and drawing heavily on the text of Jane Austen's *Pride and Prejudice* as its main source. Textual analysis of *Pride and Prejudice* will be used to find portions that are similar to Pakistan's marriage system and will be contrasted accordingly through comparative scrutiny.

Many research papers and articles on Jane Austen's critique and other relevant resources are used as secondary sources for this research paper.

3: Analysis and Discussion

1. Historical perspective

The eighteenth century is often referred to as the Romantic Age or the Age of Romanticism because of its literary style. The eighteenth-century upheavals like the American Revolution and the French Revolution influenced this literary trend. It was common for poets and authors to express themselves via emotion, a love of nature, and a fascination with the sublime. Revolting against the established norms of classical society in the seventeenth century, the Enlightenment represented a social revolution (Vorachek, 2005).

Jane Austen was one of the few novelists whose work was entirely novelistic. Throughout her writings, she improved and simplified her ideas to match the current state of English society. She remained focused on the novel's structural and technical merits (Hakim, 2004). For her work, she chose to concentrate on the most fundamental human emotions and sentiments rather than accentuate the Romantic era's existing themes. It's hard to find a more honest example of someone who wrote art for the purpose of creating art than in her (Fischer, 2009).

2. Element of Marriage

Pride and Prejudice, by Jane Austen, was published in 1813. First impression was the title given to the piece in 1796-1797. Marriage is a major theme in the book. Austen emphasizes the many social bases for personal adjustments through marriage of the protagonist of the novel 's (Lascelles, 2000).She illustrates the benefits and drawbacks of marriage using one prior relationship and four subsequent ones.

Austen mocks English society by mocking this customary mentality. Marriage is viewed as a social contract where both parties are bound. Their obligations to one another required them to be each other's faithful significant other. As a result, even a comfortable lifestyle seems inadequate. You are safe if you have money (Ali et al., 2012).

The Bennets, Elizabeth Bennett's family, is the focus of this novel. Mrs. Bennett is always thinking of husbands for her daughters. Mrs. Bennett hopes that a wealthy bachelor will fall in love with one of her daughters when he arrives in town. The mother's five daughters are Jane, Elizabeth, Mary, Catherine (Kitty), and Lydia. Mrs. Bennett's concern about marriage was shared by all English mothers at the time.

Their daughters were born with a natural fear of the unknown. So they had a preconceived notion of marriage (Knox et al., 2004). This relates to the English social structure. He is a well-off bachelor from a wealthy social circle. When he arrives in town, Mrs. Bennett immediately begins her personal sleuthing to find him a spouse. The decision to marry should be left solely to the two partners. This couple's union shows one spouse losing status, while the other gains one. They represent love's tenacity in the face of adversity.

3. Marital concept in the society of Pakistan

Marriage is a vital concept in Pakistan. Pakistani weddings are mostly based on what can be witnessed in Austen's *Pride and Prejudice*. Marriage and romance were valued social customs in Jane Austen's time. In this case, a bachelor's financial stability is clearly relevant to his married life. It was vital to safeguard the couple's social and financial well-being, as well as the inherited property for future generations. For well-off girls, arranged marriages were the norm (Donnan, 2018).

Mrs. Bennett in *Pride and Prejudice* is obsessed with finding suitable husbands for her adult daughters. Marriage is obligatory in Pakistan once a person reaches puberty. Regardless of how long it takes, the idea of marriage is clearly communicated. As social outcasts, spinsters face pressure to marry (Korson, 2017).

Women value financial security. Parents want their daughters to marry wealthy men. Some parents educate their daughters to get them married into wealthy and secure homes. In Pakistan, there are social climbers in every class. Like Mrs. Bennett, many Pakistani mothers want their daughters to marry wealthy men. Dowry is when a bride brings a large amount of household goods to her husband's home. Many people equate the bride's value and that of her family with what she brings or does not bring (Kumar, 2020).

4: Conclusion

Pakistani culture can be traced back to 17th century English marriage. Marriage problems persist despite advances in civilization and can be traced back in time. Victorian England's society was dogmatic in many ways as we do have the same preoccupation still persisting in our own time. Domestic partnerships, for example, have been changed to suit people. Public opinion no longer matters in society. A

person's autonomy should be based on their own thoughts and actions without consulting others.

In Pakistan, marriage in most cases is still based on Victorian ideals. Society and family, especially parents, have an impact. Everyone is curious about a person's marital status after puberty. This idea has waned in popularity. Urbanites and educated families are well aware of the many restrictions on marriage, including the legal marriage age. Teaching one's children is vital in today's society. The children's marriage is only considered when they are old enough to make their own choices. Otherwise, it was a matter of urgency to marry off children young. However, many backward communities still struggle with dowry, feudalism, child marriage, and financial stability. Pakistani society appears to be lagging behind in terms of marriage customs and traditions.

So there is a dire need to instill a spirit of awareness and understanding in this regard to do away with all such dogmas that lead to problems related to marriage in Pakistan. Art and literature can play its role in this regard if studied and applied on a utility ground with respect to our contemporary problems. Austen's fictional works are relevant, helpful and potentially effective to highlight and resist the set dogmas still prevalent in our culture related to marriages. To cope with our contemporary issues there is a need to explore these literary works on their utility grounds to our own culture setting. This is how the study of literature may lead to fruitful potential outcomes for us to seek solutions for many of our problems in the long run.

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Theories and Complexity of Second Language Acquisitio

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Abstract

Skill building hypothesis are always in rivalry with other powerful Second Language Acquisition (SLA) theories for instance the comparison of the most powerful hypothesis – Comprehension Hypothesis against its skill-building rivals – Output and Interaction hypothesis. The output of any target language depends on the editing of the output of the acquired language. This research paper also attempts to argue the explanation of SLA in the light of recognized attempts. The article attempts to take a different perspective that leads to a deeper and broader SLA process. The inherent ability, contributing factors and conditions make SLA an evidence based complex system. To prove this prospect, different SLA theories have been reviewed for their SLA treatment as all of them have posed a different perspective on Second Language Acquisition. The learning experiences of the second language learners have been studied in the light of multiple hypothesis such as Acculturation, Behaviorism, Connectionism, Interaction, Universal Grammar, Comprehension, Output hypothesis etc. Throughout, from researching the topic to its finalization the SLA has been considered for its complexity as explained through different theories / hypothesis.

Keywords: Second Language Acquisition (SLA), Complex System and Hypothesis.

Introduction

Complexities of Second Language Acquisition are many as the Second Language Acquisition (SLA) process requires acquisition of vocabulary of target language and learning grammar structures to develop target culture awareness and communication skills. White is of the view that cognitive and affective domain elements are equally important for Second Language Acquisition¹. Affective domain refers to the feelings or

¹ L. White, "Second Language Acquisition and Universal Grammar," Cambridge University Press, Cambridge, 2003.

emotions (e.g. self-esteem, self-confidence, competitiveness and anxiety) where anxiety being the most crucial language learning factor. Linguistic and cognitive elements do not necessarily make up the complete scenario of Second Language Acquisition (SLA). The motivation and urge to learn increase language learning effectiveness which asks for the understanding of anxiety factor. The complexity resides in the relationship between anxiety of the learner and the foreign language which reflects feelings of tension, worry, apprehension, nervousness and autonomous arousal of nervous system². Language is surely impaired due to the worry, nervousness and apprehension. Spielberger writes that the individual experiencing nervousness, apprehension and worry refers to anxiety³. Anxiety is discussed in debilitating and facilitative aspects as it can also pose positive effects. The explanation of the phenomenon has never been the target of SLA theories. Unlike other learnings the language learning is not linear. One cannot predict it under any SLA model. SLA theories are in abundance. At least forty SLA theories have been proposed¹¹. These theories have ignored the crucial aspects (grammar, semantics, pragmatics, etc.) and have merely discussed the syntactic structures (structures of prediction, modification, complementation and coordination) of target language. The brief overview of Second Language Acquisition and their contemporary tendency has been seen as an emergent phenomenon. The number of hypothesis and theories on Second Language Acquisition is huge. For the consumption of the house, here in this research paper, I have selected six of them: Comprehension Hypothesis, Output Hypothesis, Interaction Hypothesis, Acculturation, Behaviorism and Sociocultural Theory. The selected hypotheses and theories have cause huge impact in the field of Second Language Acquisition.

Comprehension Hypothesis

Krashen, in his attempt to explain Second Language Acquisition, worked on the basis of Chomsky's assumptions considering language as an innate faculty and propounded a proposal which proved influential as it emphasized the difference between learning and acquisition. Initially the proposal was named as monitor model but later it was renamed as input hypothesis⁴. It focused on the data responsible for feeding acquisition. Recent developments considered acquisition as a result of mental process and it has been referred as hypothesis model. Other hypotheses are closely related to comprehension hypotheses. It does not deal with the conscious learning but with the subconscious acquisition⁵. The outcome requires comprehensible input as a result of predictably ordered emergence of grammatical structure. Language acquisition is hindered through a strong affective filter – anxiety. Anxiety prevents the input to access the brain where language acquisition occurs. The perspective of Krashen's model is linear that establishes cause and effect relation between input and language acquisition. It also advocates the predictably ordered acquisition of grammatical structures. The theory purely discusses the acquisition of grammatical structures with a visible lack of research-based evidence⁶. The comprehension hypothesis makes a sense within its

² Horwitz, E. K., Horwitz, M. B., & Cope, J. (1986). Foreign language classroom anxiety. *The Modern language journal*, 70(2), 125-132.

³ Kim, J. A., Szatmari, P., Bryson, S. E., Streiner, D. L., & Wilson, F. J. (2000). The prevalence of anxiety and mood problems among children with autism and Asperger syndrome. *Autism*, 4(2), 117-132.

⁴ S. D. Krashen, "The Input Hypothesis: Issues and Implications," Longman, London, 1985.

⁵ S. D. Krashen, "Applying the Comprehension Hypothesis: Some Suggestions," Paper Presented at *13th International Symposium and Book Fair on Language Teaching (English Teachers Association of the Republic of China)*, Taipei, 13 November 2004.

⁶ V. Cook, "Linguistics and Second Language Acquisition," St. Martin's Press, New York, 1993.

existence but this sense cannot be verified contrary to those which consider language learning as a pure social practice.

Output Hypothesis

Krashen's radical stance on the input has been negated by Swain as he advocated output hypothesis. Output hypothesis has also been termed as lingualization⁷. Learners can observe their production through constant practice essential for the Second Language Acquisition

(SLA). Her difference lies in the learners' stimulation in order to move from strategic processing, semantic and open-ended non-deterministic which prevail in the comprehension of the complete grammatical processing essential for accurate language production⁸. According to her 'Noticing' is mandatory in second language acquisition. She hypothesized that output also serves two other functions which are testing and triggering of hypothesis. Triggering hypothesis is also a metalinguistic function. Learners' may output the language just to experience what works and what does not work. It is kind of reflection on the language while negotiating meaning to differentiate between language form and meaning being expressed. Lapkin and Swain has also used think-aloud in order to see the impact of the thought process of the learners⁹.

Interaction Hypothesis

Hatch and Long also posed resistance against Krashen's Input Hypothesis as they defended interaction hypothesis. Attempts to explain Second Language Acquisition have been made differently for interaction hypothesis¹⁰. Both were of the view that Second Language Acquisition cannot be alone explained by input. Hatch also disagreed with the sequence of learning that states that learners learn structures first and discourse later. According to her, there is a reverse possibility as one learns verbal interaction, conversation through which development of syntactic interactive structures occurs. In another empirical research conversation between native and non-native speakers were studied; it showed that more modifications are available in the interaction than in the native speakers' input¹¹. The positive role of modified input has not been rejected but the modifications in the interactions are found successful in Second Language Acquisition. Long also suggested that meanings' negotiation, especially which triggers interactional adjustment by non-native speakers or facilitates acquisition, competent interlocutor, internal learner capacities, selective attention and productive output. Theories are less effective than interactionist approaches as interaction invokes innate and environmental factors which explain learning of a language¹². It is suggested that the language must be viewed as a matter of discourse instead of taking it as a syntactic matter. Free and controlled conversations provide data on interactionist research.

Acculturation

⁷ M. Swain, "Languaging, Agency and Collaboration in Advanced Second Language Learning," In: H. Byrnes, Ed., *Advanced Language Learning: The Contributions of Halliday and Vygotsky*, Continuum, London, 2006. pp. 95-108.

⁸ M. Swain, "Communicative Competence: Some Roles of Comprehensible Input and Comprehensible Output in Its Development," Newbury House, Rowley, 1985, pp. 235-53.

⁹ M. Swain and M. Lapkin, "Problems in Output and the Cognitive Processes They Generate: A Step towards Second Language Learning," *Applied Linguistics*, Vol. 16, No. 3, 1995, pp. 371-391.

¹⁰ M. H. Long, "The Role of the Linguistic Environment in Second Language Acquisition," In: W. Ritchie and T. Bhatia, Eds., *Handbook of Second Language Acquisition*, Academic Press, San Diego, 1996, pp. 413-468.

¹¹ M. H. Long, "Input, Interaction and Second Language Acquisition," In: H. Winitz, Ed., *Native Language and Foreign Language Acquisition Annals of the New York Academy of Sciences* 379, New York Academy of Sciences, New York, 1981, pp. 259-278.

¹² D. Larsen-Freeman and M. H. Long, "An Introduction to Second Language Acquisition Research," Longman, New York, 1991.

Schumann proposed another theory which is environmental oriented through his known longitudinal using syntactic aspects with a total of six learners among which two each were included from children, adolescents and adults¹³. He used questionnaires to observe spontaneous conversations in the period of three months. The data was evaluated quantitatively. The learner who performed less mostly remained distant from the social or psychological perspectives from target groups. This view describes that the Second Language Acquisition is a result of acculturation which defines the language acquisition as a result of target group social and psychological interaction with the learner. Learners will be successful in language acquisition through acculturation if the social and psychological distances between the learners and target groups are less as they communicate in second language.

Behaviorism

Stimulus Response (SR) theory is the offshoot of behaviorism that has understood the language as a set of structures and the matters of habit formation as acquisition. Behaviorism accounts for the produced stimuli and linguistic environment without ignoring internal mechanism. The mechanical repetition makes learning an automatic and observable behavior that is acquired through stimulus and response. Language acquisition thus becomes the automatic acquisition of linguistic habits. Behaviorism is the inductive discovery of patterns that is rule governed behavior instead of product of mental processes¹⁴. The atmosphere of the learner is the surrounding environment. The criticism on behaviorism is that it helps pronunciation and rote-memorization¹⁵. Behaviorism has given birth to interlanguage studies, contrastive analysis, error analysis and comparison between first and second language as produced by second language learners.

Sociocultural Theory

Vygotskian thoughts lead to the development of sociocultural theory of Second Language Acquisition that claims language learning a socially internalized process. This socially mediated process fundamentally stands on the principle of mediation where language is a cultural artifact mediating social and psychological activities. Collaborative activities in the childhood help children to make meanings being a member of any given culture which is a purely sociocultural perspective¹⁶. Studies have also advocated the use of sociocultural theory for the second language acquisition (SLA) as the sociocultural theory sets its base in the perspective of non-separation of an individual from social interaction as humans are fundamentally social beings¹⁷. Language learners learn the language by imitating as they observe the use of language in the social setting. Learners also level up their language expertise by interacting with social actors. Vygotsky's scaffolding is another concept which has been borrowed in assistance of language learning for instance from peers, relatives, teachers, etc. These enable language learners to enhance their performance on language learning activity.

¹³ J. H. Schumann, "The Acculturation Model for Second Language Acquisition", In: R. C. Gingras, Ed., *Second Language Acquisition and Foreign Language Teaching*, Center for Applied Linguistics, Washington, 1978, pp. 27-50.

¹⁴ M. Johnson, "A Philosophy of Second Language Acquisition," Yale University Press, New Haven, 2004.

¹⁵ D. Larsen-Freeman and M. H. Long, "An Introduction to Second Language Acquisition Research," Longman, New York, 1991.

¹⁶ R. Mitchell and F. Myles, "Second Language Learning Theories," 2nd Edition, Arnold, London, 2004.

¹⁷ J. Lantolf and S. Thorne, "Sociocultural Theory and Second Language Learning," In: B. VanPatten and J. Williams, Eds., *Theories in Second Language Acquisition: An Introduction*, Lawrence Erlbaum, Mahwah, 2007, pp. 201- 224.

Complexity of Language Acquisition

Understanding language learning phenomenon is paradoxical. One cannot reject all the theories because all make their point with reason but seem unbalanced in describing Second Language Acquisition as a whole instead of discussing a part of it. As language learning is not linear which is why it cannot be deemed as hypothesized for other models. Even a slight difference in the initial stage can cause big variations in the outcomes. Previous efforts when put together provide a wider canvas of understanding Second Language Acquisition phenomenon. The creativity zone lies in the maximum potential of learning when combined with maximum models and making maximum possible connections. Many research fields have been influenced by complexity and chaos in Second Language Acquisition. Freeman has seen striking similarities among SLA, language and complexity¹⁸. Her arguments present Second Language Acquisition as a complex, dynamic and non-linear phenomenon referring to a dynamic change¹⁹. According to Thornbury, other complex systems also share some of their features with language and language learning²⁰. Grammar responds to the incoming data and restructures itself. The language learning is emergent, adaptive, self-organizing, non-linear and feedback sensitive. Van Lier pointed that it cannot be claimed that environmental stimuli cause learning or it is genetic but the learning is an outcome of complex interactions between language learner and environment²¹. The interaction system of Second Language Acquisition includes numerous factors such as political strategies, learning strategies, motivation, etc. Complex model also admits the existence of the language sustenance and innate mental structures which are acquired through automatic linguistic habits and repetition. Second Language Acquisition systems moves with the help of help of personal affiliations and culture. For such SLA systems interaction, input and output are of crucial importance for language learners as they trigger sociocultural and neural connections.

Language has to be taken as non-linear system which is dynamic and constitutes of interrelated sociocultural, bio-cognitive, political and historical elements. Society enables herself to think and act through this system. Language is not static but it is constant moving system which is influenced through interacting elements which help language evolve. The constant and dynamic interaction among moments of turbulence, alternating stability and subsystems keep language developing. Human are also complex and different, they differ in contexts so do in the mediation of SLA processes through human cultural artifacts and agents. Similar settings may produce different learning experiences. Language learners may respond differently to similar circumstances. Educational contexts are struggling to create equilibrium for not language teaching but about the language that leads to strict policies, adjustment of status quo, resistance to change and rigid hierarchies²². Auto-organizing SLA system can overcome learning deficiencies where teacher does not steer the language acquisition but the learners are empowered beyond contextual boundaries. The ability of overcoming political, social and economic constraints by the language learners will

¹⁸ D. Larsen-Freeman, "Chaos/Complexity Science and Second Language Acquisition," *Applied Linguistics*, Vol. 18, No. 2, 1997, pp. 141-165.

¹⁹ D. Larsen-Freeman, "Second Language Acquisition and Applied Linguistics," *Annual Review of Applied Linguistics*, Vol. 20, 2000, pp. 165-181.

²⁰ S. Thornbury, "Uncovering Grammar," Macmillan Heinemann, London, 2011.

²¹ L. Van Lier, "Interaction in the Language Curriculum: Awareness, Autonomy, and Authenticity," Longman, London, 1996.

²² D. L. Gilstrap, "Strange Attractors and Human Interaction: Leading Complex Organizations through the Use of Metaphors," *Complicity*, Vol. 2, No. 1, 2005, pp. 55-69.

decide their pace of language acquisition as these agents limit their learning capacities. Interlanguage dynamicity develops through mediation between learners' experiences and second language cultural production during interactions with proficient speakers. These experience cause necessary shift by disturbing the order to keep Second Language Acquisition occurring.

Conclusions

The theory of Second Language Acquisition is complex to understand that explains the certain and sudden progress of a learner for language acquisition because stability and change occurs during the process. Unpredictable consequences can be related to negligible stimuli because the same learning strategies do not produce similar outcomes for all language learners. The outcomes can be positive or negative and sometimes unpredictable due to the complexity of the system of the application of certain SLA hypotheses or theories. Such as, the comprehension hypothesis makes a sense within its existence but this sense cannot be verified contrary to those which consider language learning as a pure social practice; learners' may output the language just to experience what works and what does not work – Output Hypothesis; Interaction Hypothesis suggested that the language must be viewed as a matter of discourse instead of taking it as a syntactic matter and Sociocultural theory claims language learning a socially internalized process. Thus, understanding language learning phenomenon is paradoxical. One cannot reject all the theories because all make their point with reason but seem unbalanced in describing Second Language Acquisition as a whole instead of discussing a part of it. As language learning is nor linear which is why it cannot be deemed as hypothesized for other models. Formal contexts help teachers to activate learning mechanisms but it also results in the creation of certain barriers. Learners empowerment and autonomy can help in removing these insurmountable barriers. Teachers are responsible to create possibilities which promote interaction among native speakers, competent speakers and language learners. Chaos must be provoked by disturbing comfort zone of the language learners through social process which encourages interactions among speakers facilitating small changes which will ultimately create significant observable effects in second language acquisition.

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