



Proceeding for International Conference on
“Multidisciplinary Innovation in Academic Research”
(MIAR-19)

Zurich, Switzerland

27th-28th April'19

International Institute of Education, Research and
Development

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IIERD-Explore

Editorial:

We cordially invite you to attend the International Conference on Multidisciplinary Innovation in Academic Research (MIAR-19), which will be held in Zurich, Switzerland on April 27th-28th, 2019. The main objective of MIAR-19 is to provide a platform for researchers, engineers, academicians as well as industrial professionals from all over the world to present their research results and development activities in Multidisciplinary Innovation in Academic Research. This conference provides opportunities for the delegates to exchange new ideas and experience face to face, to establish business or research relations and to find global partners for future collaboration.

These proceedings collect the up-to-date, comprehensive and worldwide state-of-art knowledge on Multidisciplinary Innovation in Academic Research. All accepted papers were subjected to strict peer-reviewing by 2-4 expert referees. The papers have been selected for these proceedings because of their quality and the relevance to the conference. We hope these proceedings will not only provide the readers a broad overview of the latest research results on Multidisciplinary Innovation in Academic Research but also provide the readers a valuable summary and reference in these fields.

The conference is supported by many universities and research institutes. Many professors played an important role in the successful holding of the conference, so we would like to take this opportunity to express our sincere gratitude and highest respects to them. They have worked very hard in reviewing papers and making valuable suggestions for the authors to improve their work. We also would like to express our gratitude to the external reviewers, for providing extra help in the review process, and to the authors for contributing their research result to the conference.

Since February 2019, the Organizing Committees have received more than 30 manuscript papers, and the papers cover all the aspects in Multidisciplinary Innovation in Academic Research. Finally, after review, about 11 papers were included to the proceedings of MIAR-19.

We would like to extend our appreciation to all participants in the conference for their great contribution to the success of International Conference 2019. We would like to thank the keynote and individual speakers and all participating authors for their hard work and time. We also sincerely appreciate the work by the technical program committee and all reviewers, whose contributions make this conference possible. We would like to extend our thanks to all the referees for their constructive comments on all papers; especially, we would like to thank to organizing committee for their hard work.

Acknowledgement

IIERD is hosting the International Conference on Multidisciplinary Innovation in Academic Research this year in month of April. International Conference on Multidisciplinary Innovation in Academic Research will provide a forum for students, professional engineers, academician, and scientist engaged in research and development to convene and present their latest scholarly work and application in the industry. The primary goal of the conference is to promote research and developmental activities in Multidisciplinary Innovation in Academic Research and to promote scientific information interchange between researchers, developers, engineers, students, and practitioners working in and around the world. The aim of the Conference is to provide a platform to the researchers and practitioners from both academia as well as industry to meet the share cutting-edge development in the field.

I express my hearty gratitude to all my Colleagues, staffs, Professors, reviewers and members of organizing committee for their hearty and dedicated support to make this conference successful. I am also thankful to all our delegates for their pain staking effort to travel such a long distance to attain this conference.

A handwritten signature in green ink that reads "Dr. Simpson Rodricks". The signature is written in a cursive, flowing style.

Dr. Simpson Rodricks
President
International Institute of Education, Research and Development (IIERD)

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The struggles of Ceylonese Women in Rani Manicka's, *The Rice Mother* and *The Japanese Lover*

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Abstract: — The Ceylonese Tamils' migration to Malaya started after the year 1894. Most of them were educated and were employed in the British civil service in Malaya. Brides were often imported from Ceylon for these men who are well settled in this new country. This study intends to expose the struggles faced by these Ceylonese Tamil women who were displaced due to marriage in the pre-colonial Malaya. The struggles of these women will be based on the female characters in Rani Manicka's, *The Rice Mother* (2002) and *The Japanese Lover* (2010). Manicka, who is of Sri Lankan origin, was born and educated in Malaysia. She sheds light on the complications and challenges faced by displaced women in a patriarchal society and the roles they are expected to play. Both the novels selected for this study depict the journey of imported brides in Malaya and the difficulties faced by them in adapting to the new environment. These two novels will be studied in the light of postcolonial theory by looking into the issues of displacement and identity. This paper will reveal the difficulties faced by these women in adapting to the new place and culture. Secondly, it will explore the hardships faced by these women during the Japanese occupation and finally the roles that were destined to be played by these women. Being displaced in a strange land, the main characters in both novels are forced to adapt to the new environment and the new roles that the society expected them to play.

Keywords: -- Ceylonese women, challenges, displaced women, motherhood, roles.

I. INTRODUCTION

The colonization of British over Asia and rest of the world not only displaced millions of people but also distorted the culture and the identity of many immigrant people. The Ceylonese Tamils in Malaya came from the Jaffna Peninsula and the islands to the west which forms the territory of Jaffna which covers most of the Northern Province of Ceylon. The Ceylonese Tamils' migration to Malaya started after the year 1894 whereby most of them were appointed as clerks, teachers and government servants by the British. Armed with English education, modelled after the British education system, they were sought after by the British to assist in the administration of the British Government in Malaya. By 1931, there were about 12 700 Ceylonese Tamils in Malaya, "who were highly educated and skilled" and they were employed immediately in the British civil service (Manickam 2009:18). Many held high positions in the railways and public utility department in Malaya. Some of them came in after seeing advertisement on vacancies in Malaya. After the Pangkor Treaty of 1874, the British started building roads, railways, schools and hospitals and to increase its revenue, the Ceylonese were brought in. The Ceylonese community which settled in Malaya had

close connections with Ceylon. They were very small in number compared to the Indians who were brought in as coolies from South India to work as indentured labourers in British Malaya's rubber, tea, and oil palm estates. A sound education and close knit clannish unity have kept this particular community inward looking (Manickam 2009:22). So, when it comes to marriage, they only marry people from their own clan. Since the number of Ceylonese women was small in Malaya at that time, they preferred to get their brides from Ceylon. Many young women especially teenage brides were brought into Malaya with the hope of having a better future. Therefore, this study intends to expose the lives and struggles of these imported brides in Malaya through Rani Manicka's selected novels. Rani Manicka, who is of Sri Lankan origin, was born and educated in Malaysia. She grew up in Terengganu, a state in the east coast of Peninsular Malaysia and attended University of Malaysia where she received her business degree. Like any other postcolonial writers, Manicka too brings forward the issues of the displaced people in the new country. She sheds light on the complications and challenges faced by displaced women in a patriarchal society and the roles they are expected to play. The novels selected for this study are *The Rice Mother* (2002) and *The Japanese Lover* (2010). It should be noted that *The Rice Mother* won the

Commonwealth Writers Prize in 2003. Both novels depict the journey of imported brides and the struggles endured by them in Malaya. These two novels will be studied in the light of postcolonial theory by looking into the issues of displacement and identity. In *The Rice Mother*, Manicka illustrates the arrival of Lakshmi, a very pretty bride from Ceylon to Malaya after marrying a man two times her age. She has six children and the story continues with three generations of Ceylonese women. On the other hand, *The Japanese Lover* is the reminiscing of an old woman, Parvathi who arrived in Malaya as a teenage bride. She is trapped in a loveless marriage and faces a lot of predicaments until she meets General Hattori, the Japanese General. She becomes Hattori's lover and even marries him in a temple. It is a story of unconventional love between the captor and the captured. According to Ashcroft in *The Empire Writes Back: Theory and Practice in Post-colonial Literatures*, postcolonial literature covers all the cultures affected by the imperial process from the moment of colonization to the present day. There is a continuity of preoccupations throughout the historical process initiated by European imperial aggression. The presence of British culture is prominent in the novels especially in *The Japanese Lover*. Parvathi's husband exposes her to the Western culture through his way of life. This paper will show the struggles faced by Lakshmi and Parvathi in adapting to the new place and culture. Secondly, it will explore the hardships faced by these women during the Japanese occupation. And finally the roles that these women were destined to play will be discussed.

II. THE STRUGGLES OF CEYLONESE WOMEN IN MALAYA

a. *Displacement and Identity*

Displacement occurs when a specific cultural population is moved from its original homeland or bioregion and relocated to a different setting. According to Ashcroft, "the special crisis of identity comes into being; the concern with the development or recovery of an effective identifying relationship between self and place" takes place after a displacement (Ashcroft 8). It is evident that the characters in these two novels try their best to get adapted to the new place. Both novels, *the rice mother* (2002) and *the japanese lover* (2010) depict the lives of ceylonese tamil women who were brought in as teenage brides to malaya. In *the rice mother*, lakshmi was only fourteen years old when she was married off to ayah who was thirty seven years old and a widower with two children. Lakshmi was born in sangra, ceylon in 1916. She had a white grandmother, mrs. Armstrong and therefore had inherited some of the caucasian features.

She was very pretty and the matchmaker, aunt pani convinced lakshmi's mother into getting her daughter to marry ayah, who was thought to be a very rich man from malaya.

'Lakshmi, I have accepted a marriage proposal for you,' she said to the folded sari. 'A very good proposal. He is of a better caste than we are. Also he lives in that rich land called Malaya' (Manicka 2002:13).

Her mother felt that Lakshmi will enjoy a better life if she married someone who is well settled in Malaya. The first shock for Lakshmi was getting used to the ugly looking Ayah. She had dreamed of "a thousand romantic notions" about the mysterious stranger that she was to marry.

Sitting on the dais awaiting me was the biggest giant of a man I had ever seen. So dark his skin shone like black oil in the night. On his temples, like a bird of prey, rode large wings of grey. Beneath his broad nose, long yellow teeth jutted forward, making it impossible for him to completely close his mouth. (Manicka 2002:17).

Her silly romantic dreams "desperately gasped their last breaths". When she looked at her mother who was smiling happily and proudly, she realised that due to their "abject poverty, his wealth has blinded her to everything else" (Manicka 2002:17). Lakshmi didn't want to disappoint her mother. She overcomes the feelings of fear by giving a sharp stare at her husband and he dropped his eyes. She felt that she had tamed the wild beast with a look. "He didn't turn his head to look at me. The rest of the ceremony passed in a blur" (Manicka 2002:18). After the painful sexual encounter with her husband that night, Lakshmi felt disgusted but she consoled herself by saying that at least she would "live like a queen in Malaya" (Manicka 2002:19). Like many other women from the poverty stricken land of Ceylon, Lakshmi too longed for a comfortable life. Getting married and moving to Malaya itself is considered as a lifetime opportunity to free oneself from the clutches of the God forsaken life which the natives of Ceylon had inherited for generations. Although she was married to an ugly man but she looked forward going to Malaya. When the ship approached the Penang Harbour, she became excited. The Europeans disembarked first with their "high-nosed, tightly corseted" women and followed by the others (Manicka 2002: 25). She met a Malay man named Bilal who came to pick them from the port. At first, she thought that he was a servant. She also experienced a new environment when they drove through the grocery stores and saw rows of ducks hanging at the butcher store. She was also dismayed to see Chinese women with very small

"misshapen feet clad in black silk shoes" tottering slowly (Manicka 2002:26). She was surprised to see the "dulang-washers" who covered from head to toe, cycling to the tin mines to sieve tin ore in large trays from the mining sites (Manicka 2002:29). Everything puzzled and fascinated her. However, when she arrived in Kuantan, all her dreams of a rosy garden was shattered. She realised that her ugly husband did not own the gold watch that he was wearing (belonged to Bilal) and he had a lot of debts to settle.

Mother had been tricked. The thought was heavy: My husband was not rich, he was poor. Pani had duped us. I was all alone in a strange country with a man who was not what he was supposed to be (Manicka 2002:30).

Lakshmi missed her mother very much and decided to write to her the next day. But she decided to not to tell her mother that she had married a poor man.

And I would never tell her about the soft clink that the shining gold watch, which had so impressed her, made when it fell into Bilal's upturned palm, just before he nodded and returned to his real master. (Manicka 2002:34)

The fourteen year old Lakshmi embarks on her wifely duties once she realises that she has no other choice but to play a part and take the responsibility to settle her husband's debts. The house that she was brought into belonged to a very rich Chinese man called Old Soong. At the end of the month, when Ayah handed Lakshmi an envelope with two hundred ringgit, she became overjoyed and thought that the marriage would work after all. However, her happiness was short lived when the money lender came to collect his debts. She paid him twenty ringgit and he left but the queue continued until she had only fifty ringgit to last the whole month. Besides that, she also found out that she had multiracial neighbours. Her immediate neighbour was a lorry driver and his wife Minah, who welcomed her to the neighbourhood with coconut jelly was a friendly woman. She also met Mui Tsai who is a "pitiful domestic slave" in Old Soong's house (Manicka 2002:42). Mui Tsai and Lakshmi became good friends. The snake charmer in her neighbourhood frightened her the most. He made medicine out of his poisonous cobra and Lakshmi worried "his escaped cobras were lurking" in her bed (Manicka 2002:35). She had to adapt to the new environment, people and culture in order to survive in that new land. The most horrible situation was adapting into a married life with an ugly husband whom she regarded as stupid.

Dull eyes regarded me, for a minute. I thought of a heavy animal, its lumbering slowness, its stoic endurance in the face of persistent flies and its filthy, swishing tail as it just stood there. Stupidly. (Manicka 2002:39).

Lakshmi slowly learned to adapt to her new environment and her role as a wife. She took control of her husband's debt and started saving a small amount of money in a tin which she kept in the rice sack. She started cultivating a vegetable plot behind her house. She also managed a chicken coop. It was built for her by "a man from across the main road" (Manicka 2002:47). Her friendship with Mui Tsai blossomed to the extent that Anna, Lakshmi's second child was breastfed by Mui Tsai (Manicka 2002:88). Lakshmi often heard about Mui Tsai's ill treatment as well. Though displaced in a place that is alien to her, Lakshmi managed to pull through. Her firstborns were beautiful twins, Lakshman and Mohini. However, her other four children were ugly. She felt that her daughter, Lalita was "extraordinarily ugly" and her son Jeyan was born with weak legs that could not support his body weight. Faced with these seemingly endless predicaments, this once pretty and fragile maiden from Ceylon, slowly evolved into a tough woman. Upon her mother's advise, she dug up holes and stand Jeyan inside it until he could walk. The displacement taught her to be a strong woman and mother. With six children in tow by the age of twenty, her identity changed from a teenager to a mother and wife. These changes took place forcefully in her life. Together with these changes in roles came the inevitable responsibilities which she managed with amazing guts.

Another displaced character that Manicka portrays in *The Japanese Lover* is Parvati. Unlike the pretty Lakshmi, who was cheated into marrying an ugly man, Parvathi in *The Japanese Lover* faced a different kind of fate. She was also a teenage bride from Ceylon who was brought into Malaya with lots of promises. However, Parvathi's problems were basically because of her looks. She was very dark and lacked beauty. She was born in 1916, in Vathiry, North Ceylon. She was the only daughter in the family of five sons. When she was born the fortune teller prophesised that she would marry a rich man but the marriage will be a disaster due to the two inauspicious planets, *Rahu* (the head of the snake) and *Kethu* (its tail) that are situated in her "House of Marriage". She is also bound to get "disturbances" from other men (Manicka 2010: 6). So, the priest had suggested that she pour milk on the head of a snake statue to appease it and pray to the *Pulliyar*. When she was sixteen, her father cheated a match maker by giving someone else's photograph instead of Parvathi's. The match maker arranged her to marry a very rich man in Malaya.

Then, she and her uncle boarded a ship from Colombo to Penang. After a long voyage with seasick women and the ship drifting through the "inky nights among stars", Parvathi finally arrived at Penang Harbour (Manicka 2010:19). Like Lakshmi, she too was amazed to see people of all shades of colour. She was amused to see tap water and electricity. She missed her mother more when she saw the soft mattress and bed. Everything seemed new to her and she constantly asked the "cobra" that she had worshipped back in her country to help her. Unlike Lakshmi (*The Rice Mother*), who struggled to make ends meet, Parvathi is thrust into a lavish lifestyle. Upon her arrival in Malaya, Parvathi is dressed in fine garments, with a veil covering her face and was taken to a crowded hall. She saw a tall man, much fairer than her with fierce rolling eyes as her groom. Soon, they were married and the veil was lifted and she refused to meet her husband's eyes. Later, they drove off in a long black car to *Adari*, a beautiful mansion by the beach. In this beautiful fairytale mansion, she was greeted by a line of servants and later her husband, Kasu Marimuthu harshly ordered one of the servants to take her to the West Wing of the mansion. She realised that this was the moment that she most dreaded ever since the marriage, the moment of truth. Her father had cheated the marriage broker and now she has to face the consequences. She was sent in to the "Lavender Room" which took her by surprise and awe. Kasu Marimuthu returned home drunk. Kasu Marimuthu, one of the wealthiest businessman in Malaya upon discovering that the bride promised to him wasn't as beautiful and fair as depicted in the photograph grew mad and threatened to send her home in disgrace saying "I asked for a bird of paradise and I'm given a puny peahen" (Manicka 2010: 27). Kasu accepted Parvathi after being threatened and advised by his servant, Maya who said that it was his karma that he had to marry her. However, the acceptance came with a heavy price. Parvathi had to transform herself in order to live up to his expectations. She was taught to use the Western toilet and eat Western food. She also had to learn up on how to use the cutlery as her found her to be very uncivilised.

***'You can remove my wife's cutlery, Gopal. She will eat with her hand.' Turning to her he said, 'Tomorrow you will learn to use cutlery so that for the time you are here at least, you will be civilised.'* (Manicka 2010:64)**

Kasu also engaged a personal teacher to teach Parvathi to read and write in English. Worst of all, the displacement caused her to change her identity. Kasu Marimuthu changed her name to Sita. "For the rest of your stay here you will answer to the name Sita", Kasu ordered. Since his first wife's name was also Parvathi, Kasu disliked it as Parvathi's features and looks were far from his first wife.

***"You're nothing like her and you don't deserve such a name," he spat viciously. "She was tall and fair, a dazzling beauty. I will never use her name on you."* (Manicka 2010:59)**

He humiliated Parvathi further by saying that in ancient stories, inconsequential characters are known by more than one name and she is obviously not the heroine of the story. Later, through Kamala, another servant, Parvathi learned about the Anglo-Indian first wife of Kasu Marimuthu. She was told that she had absconded to Argentina with a polo player who often attended Kasu's lavish parties.

Eventually, Parvathi learns to handle Kasu. Later, Parvathi found out that Kasu had an affair with a dancer and had a daughter. She brought in the girl, Rubini to live with her after the dancer died. Rubini detested Parvathi very much. She blamed Parvathi's existence for her mother's death.

***'And every time I see you I think of myself asking my mother for Papa and her answering, "He's gone home to his wife. We can't be selfish. We have to learn to share."* (Manicka 2010: 187)**

As time passed, Parvathi evolved into a tough woman. The displacement built her spirit not to give up on anything easily. Before the coming of Japanese, Kasu fell ill. He was paralysed and bed ridden. Parvathi took care of him well with the help of Maya, her servant. Finally Kasu confessed to her of how glad he was that he had married her.

'I want you to know that I am glad I married you, he said. 'I was a fool to chase after beauty. It's a handful of air. When I am gone, do not wear the white sari of the widow ...'(Manicka 2010:172)

Kasu Marimuthu who wanted a modern and beautiful wife, finally realised that he actually had married the right woman. Both Lakshmi and Parvathi had to adapt to the new environment that they were displaced in. Their lives transformed tremendously compared to the kind of life that they had lived in Ceylon. Although life here in Malaya was more comfortable compared to their lives in Ceylon, but mentally they were tormented. Mainly, it was because of their spouses. In order to survive the demanding and harsh world, they had to transform themselves to the need of the new country. Lakshmi who realised that Ayah had many debts, started to run her family in a very economic manner and slowly released Ayah from his debts. On the other hand, Parvathi in *The Japanese Lover* transformed into a new woman in order to please Kasu Marimuthu. She learned to read and

write in English and eventually evolved into a very sophisticated woman. She was expected to adapt to a more Western lifestyle. She was taught and finally prepared to host parties that involved the rich acquaintances of Kasu Marimuthu.

The Sufferings during the Japanese Occupation

As these women were slowly adapting to their new environment, gathering their hopes, believing that they will strive in the new land after all, fate had other plans for them. Their plans and dreams were suddenly interrupted with the arrival of the Japanese army. Their dreams were short lived and their hopes were maimed forever. All the struggle and hard work to build a new life in the country and the little happiness these women managed to salvage were forever ruined by the Japanese. The Japanese attack on Malaya started on 8th December 1941. The Japanese forces marched into Malaya through Kota Bharu, Kelantan, a state in the east coast of Peninsular Malaya. The following day, bitter fight took place in Kuantan, where both these novels are set. At that time, Malaya was producing 40% of the world rubber and 60% of the world's tin. Capturing Malaya was like winning a jackpot for the Japanese. The Japanese force was led by General Tomoyuki Yamashita who managed to make the British surrender within two months. Within 55 days, they had overrun the entire Malayan peninsula. As for these women, life is never going to be the same again. Both women were terribly affected by the invasion of the Japanese in Kuantan. Both the novels depict the struggles of the women during the Japanese occupation and how they survived the pain and bitterness of being a woman and a mother. Manicka clearly illustrates the sufferings of these Ceylonese Tamil women in the hands of the Japanese soldiers. In *The Rice Mother*, Manicka shows how the beautiful daughter of Lakshmi had to be hidden from the Japanese soldiers. Lakshmi feared that her daughter, Mohini, will be abducted by the Japanese soldiers and turned into their comfort woman. Lakshmi was very cautious that she hid Mohini in a secret hole in the ground at all times. The hiding place was a hole that had been cleverly cut out of the floorboards of the house. She covered the trap door with a huge chest which was sent to her by her mother from Sangra. When General Ito and his men invaded their neighbourhood, the first house they ransacked was the old Soong's house. Since Mui Tsai was available, "they didn't bother to look too hard for the other carefully hidden daughters" (Manicka 2002:123). So, Lakshmi thought that her daughter, Mohini, will be safe. One day, as Lakshmi sat with her children talking, the Japanese arrived at her door step. Lakshmi, who was supposed to drag Mohini into the hole, lost his footing and fell through the trapdoor instead. Mohini, who realised that there was no space for her to hide, quickly shut the door and moved

the chest on it. General Ito and his men took the fourteen year old beautiful Mohini forever from her family. When Lakshmi begged General Ito to spare her daughter, he kicked her hard in the stomach. In order to stop the General from taking away her daughter, she exposed Ah Moi's hiding place. The cruelty of the Japanese stunned Lakshmi.

They were arrogant, uncouth, cruel and unforgivable, as long as I live I shall hate them with a mother's wrath. I spit their ugly faces. My hate is such that I will never forget, even in my next life. I will remember what they have done to my family and I will curse them again and again so that they will one day taste the bitterness of my pain (Manicka 2002: 203-204).

Life was never the same for Lakshmi and her family after losing Mohini to the cruel Japanese. Her regret for not being able to save Mohini haunted her till the end and that incident affected the whole family terribly. Lakshmi herself became a bitter person while Mohini's twin, Lakshmi, never came out of the guilt of not being able to save his sister.

Manicka also highlights the cruelty of the Japanese in *The Japanese Lover*. One week after Marimuthu's death, the Japanese invaded her mansion, *Adari*. She had to make the right decision to save her stepdaughter, Rubini, from being taken away to be a comfort woman. She remembered that her husband and the Mamis had declared that the Japanese were only interested in the fair-skinned women, and "even then only to rape and use them once" (Manicka 2010:185). She was in disbelief when General Hattori said that she can take Rubini's place if she wishes to spare her.

No mercy, no smile of encouragement. Nothing. Just a blank wall asking her to be his infu, his comfort woman. She had begun life in the white sari of a widow only last week. (Manicka 2010:185)

Their mansion, *Adari*, is officially taken over by the Japanese. General Hattori set his office there and Parvathi's family moved to their provision shop on Wall Street. She was to serve him whenever there is a call from him. 'I'll send someone at midnight tomorrow for you,' he said and that was the beginning of another episode in Parvathi's life. She became General Hattori's comfort woman. Her frequent visits made the General become obsessed with her and she became his puppet. He dresses her in Kimono and colours her up like a Geisha. As time passed, Parvathi too fell for the General and in October 1944, she marries the General, in a far away Murugan temple. It was an unspoken rule for the Japanese army men not to take wives as "they were not to leave progeny"

(Manicka 2010:223). Parvathi longed for the war to be over but "the thought of parting from him was unbearable" (Manicka 2010:222). Parvathi felt distressed. She was married. Yet this was not a marriage, not really.

They were doomed lovers of Japanese legends:as the shining bells toll at the coming dawn, they take their own lives. (Manicka 2010:223)

Manicka shows how Parvathi who at first thought that she had sacrificed her life for the family and community, had helplessly fallen in love with the Japanese man. When the Japanese army surrendered, the General came to bid her goodbye. He presented her an umbrella with cherry blossom design and promised to come back for her.

If for any reason we lose contact are unable to reach each other, remember that on the day this country gains independence from the British, I will meet you at the main railway station in Kuala Lumpur, let's say noon on the platform where the trains depart for Kuantan. (Manicka 2010:242)

Malaya got its independence on 31st. August and as promised Parvathi went to the railway station to meet General Hattori but instead she met his wife. She learned that the general had died and requested his wife to hand her a gift.

'At first, I wanted to throw it away. I hated him for what he had done, but I couldn't turn away from it. And the longer it stayed in the cupboard, the more it haunted me. I wanted to see you, the woman that made him look like that. Now that I know, I can go back in peace'. (Manicka 2010:285)

Time soon passes and Parvathi became known as Marimuthu Mami. She lived in a storeroom and still had the cherry blossom design umbrella with her which brought back so many memories, pleasant and unpleasant.

New Roles in Malaya

In *The Rice Mother*, Manicka highlighted the different roles played by Lakshmi. Lakshmi's role as a mother is depicted in a very realistic manner. She is a mother but not a perfect mother. The author attempts to be honest about the unexamined side of female characteristics in this novel whereby Lakshmi is pictured as a woman who has flaws and those imperfections have touched the reality of being a woman. Lakshmi, who was a child bride married to then a Malayan expatriate named Ayah, grows out to be very matured and enterprising. In spite of having six children with Ayah, Lakshmi lives an unfulfilling married life with Ayah who does not serve his purpose as a husband but somehow, Ayah loves his wife

dearly. Lakshmi, tends to favour her first beautiful twins Lakshman and Mohini. She became selective towards her other four children (Anna, Sevenese, Jeyan and Lalita) and her affection towards the twins was special. However, Lakshmi, Jeyan and Lalitha do not fit into her high ideals of perfection and beauty thus she never quite had the same adoration that she had towards her twins. She is pictured as a mother who practices favouritism. After losing Mohini to the Japanese, she became a very impassionate person. Nothing could compensate her loss.

When Lakshmi first came to Malaya, she realised that Ayah had lots of debts. It frustrated her and she decided to take control of the finance.

...Finally, taking a deep breath and looking him directly in the eye, I told him that from now on I would be the only one paying the bills. He would receive a small allowance to buy newspaper or a cup of coffee from the canteen at work, but he could borrow no more money and was to refer to me on anything pertaining to our financial health. (Manicka 2002:46)

With her stern talk, Lakshmi was able to silence Ayah's role as the head of the family and instead she became the head whereby she controlled the finance in the family. She managed the family's finance well, cleared all of Ayah's debts and managed to save up substantial amount of money. She remained the head of the family even after Ayah's death.

Besides that, Lakshmi was an enterprising woman. She was a good peasant where cultivation is concerned. She had cultivated her own vegetable plot and reared chicken. During the period of Japanese occupation, Ayah had lost his job and they lost their "entitlement to the precious ration cards". She realised that she had "no time to moan and groan or to appreciate the pitying looks from the ladies in the temple whose husbands had managed to retain their jobs"(Manicka 2002:205). She sold some of her jewellery and bought cows. She sold milk to the coffee shops and used the money to buy her groceries from the black markets. In short, she was a survivor.

During the Japanese time I made my own soap with leaves, tree bark, cinnamon and flowers....I made my own coconut oil.. (Manicka 2002: 206).

Parvathi in *The Japanese Lover* too played many roles. As a teen bride, she was exposed to so much of hatred. Kasu Marimuthu disliked her because he was cheated into marrying an ugly creature. He wanted to have a beautiful wife and Parvathi's dark complexion put

him off. However, Parvathi was given a chance to reform herself. She received Western education and was trained to be dynamic woman. She became the woman of the house. Later, when Kasu died she became the head of the family. When the Japanese invaded her home, she as the head of the family had to come to a decision. She became martyr in order to save the chastity of her step daughter, Rubini. Thus, began another new role for her as a comfort woman for the Japanese General. Though at first, she was only used as a sexual partner, but later General Hattori fell for her. He somehow saw beauty in her dark complexion. They even got married. When the war ended, General Hattori returned to Japan, promising to keep in touch with her and return to Malaya on its independent day. This promise never materialized as he died before that. Parvathi becomes a senile and locks herself in the dark store room. Being alone, she reminisces her past.

III. CONCLUSION

These two novels by Manicka are the voice of the silenced women during the pre-colonial and postcolonial period in Malaya. Many of the Ceylonese women who were brought into Malaya through marriages faced untold predicaments and agony. Adapting to a new environment, culture and society was not easy for these women. They agreed to marry men who were settled in an alien country with the hope of having a better life than their mothers and grandmothers. However, most of them did not live the life that they had anticipated. Through these novels, Manicka is awakening the forgotten plights of the women who suffered silently in Malaya. She becomes the voice for the child brides who were brought to Malaya with full of deception to marry older men who were believed to be financially secured and will redeem them from the unending misery they lived in their native land. The beautiful Lakshmi was deceived into marriage to an ugly widower just because he is believed to be rich in Malaya. On the other hand, the rich Kasu Marimutu is cheated by the matchmaker whereby the ugly Parvathi was married to him. However, both women came into Malaya as childbrides to marry men much older than them. The invasion of Japanese into Malaya and the Japanese soldiers' acts towards women was a big shock to the women in Malaya then. Many women were captured and made into comfort women. In both novels, Manicka shows how the women suffered in the hands of the Japanese soldiers. Both women, Lakshmi and Parvathi represent the soul of many women who lived, suffered and died in silence due to the fate which were not of their making.

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Personality Factor in Cognitive Process: Does Extravert is Superior than Ambivert?

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Abstract:- Background: Differences in personality may indicate dissimilarity in the process of cognition. Objectives: To investigate the personality factor (extraverts versus ambiverts) in cognitive processing through the neuroscience approach (i.e. Event Related Potential technique). Method: Forty undergraduate medical students from Universiti Sains Malaysia (USM) were recruited and screened for personality by using USM Personality Inventory (USMaP-i). In the Event Related Potential (ERP) session, participants (N=19 ambiverts and 20 extraverts) completed a visual oddball paradigm in counterbalanced order. Results: As compared to ambiverts, the extraverts showed diminished P300 amplitude at the frontal region (Fz electrode), but not at other regions. Conclusion: Eysenck Theory on the superiority of extravert (as compared to non-extravert) to experience better psychological well-being is challenged, thus, signalling the important implication to the humanity and society.

Keywords: Personality, Cognitive processing.

I. INTRODUCTION

The cognitive profiles of different personality types have garnered much interest in the advent of machines such as electroencephalography (EEG) and functional magnetic resonance imaging (fMRI). Among them, the extraversion-introversion continuum of the Big Five model is the most stable personality trait across a person's lifespan. [1] More commonly understood as an indication of social adaptability, [2] high levels of extraversion is associated with a preference for interpersonal interaction, excitement, impulsiveness, outspokenness, and popularity. [3], [4]

In his theory, Eysenck posited that one's level of cortical arousal explains their degree of extraversion. [5] Extraverts have chronically lower levels of cortical arousal than introverts, thus leading them to seek stimulation from the external environment to achieve and maintain optimal cortical arousal. [6] However, both extraverts and introverts are 'extreme scorers' on both ends of the extraversion scale and as such, most studies on these personality types are not reflective of the general population, whose personality fall between the two extremes. [7]

Ambiverts are neither introverts nor extraverts, but possess the features of introversion and extraversion which manifest in different situation. [8] They are reasonably contented with social interaction, but can also appreciate time alone, away from crowds. In comparison, ambiverts have a different cognitive profile as evidenced by a lower cognitive impairment risk [9] and higher IQ scores [10]

than both extraverts and introverts. Despite that fact that ambiverts represent the majority of the human population, only few researches compared the neurophysiological correlates of ambiverts to that of highly introverted and extroverted individuals. [11], [12], [13] In personality research, the P300 ERP component is commonly investigated in relation to extraversion, and remains a popular non-invasive measure of attention, decision making, and memory or context updating. [14], [15], [16] It is a large, phase-locked positive deflection that commonly occurs around 250ms to 900ms after presentation of a stimulus. [17] In visual and auditory settings, extraverts produced smaller P300 amplitudes than introverts. [18], [19] Similar findings were obtained in studies of emotion processing, where extraverts with lower baseline arousal levels also produced smaller P300 amplitude. [15], [20] Other studies by Beauducel et al. [21], Gurrera et al. [22], Gurrera et al. [23] and Philipova [24] however reported P300 amplitude to be positively correlated with extraversion levels whereas Lindin et al. [25] and Ortiz et al. [26] found no difference in P300 amplitude.

Extraverts and introverts react differently. It is reported that extraverts have faster/shorter motor response [27] but slower thought processing speed [11] compared to introverts. In another study, warning stimulus (that provided future information) induced larger P300 amplitudes in introverts than in extraverts, when compared to critical stimulus (that provided closure). In addition, P300 latency was also influenced by task demands. [11], [28] The effort invested in tasks also

differed by personality type based on the situational demands of the experiments [18] as introverts allocated more sustained attention in vigilant tasks than extraverts. [29] As demonstrated, most studies compared extreme scorers on the extraversion scale, but little light has been shed on how extreme scorers compare with the intermediate subgroup that better characterise the general population, i.e. ambiverts. In a proceeding originated from the current study, Yusoff et al. [30] proposed that both personality types share similar cognition processing as measured by an EEG auditory oddball task where participants counted only the low tones; there were non-significant differences in P300 amplitudes and latencies between extraverts and ambiverts. In a similar study, Georgiev et al. [7] found instead that ambiverts produced greater P300 amplitudes than introverts and extraverts. However, different task demands revealed different findings. Georgiev et al. [7] found that in comparison to introverts, extraverts and ambiverts produced larger P300 amplitudes in a passive auditory paradigm. In conditions requiring behavioural responses to the tones, Georgiev et al. [7] found that extraverts exhibited the largest P300 amplitude.

Based on above background, thus, the current study sought to further investigate the differences between extraverts and ambiverts in cognitive processing, indicated by the cognitive substrate of P300 component. It is hypothesised that there would be a significant difference in P300 amplitudes between ambiverts and extraverts in visual oddball paradigms.

II. METHOD

Sample

Participants were 40 undergraduate medical students from a public university in Malaysia (Universiti Sains Malaysia, Health Campus). Twenty ambiverts and 20 extroverts were recruited, as determined by their responses on the USM Personality Inventory (USMaP-i). This study obtained ethical clearance from the Human Ethical Committee of Universiti Sains Malaysia (Reference number: USMKK/PPP/JEPeM [267.2.(7)]). They reported normal or corrected-to-normal vision, had no lifetime history of a major medial disorder (neurological, hepatic, or cardiovascular), no history of affective disorder, and no history of using psychiatric medication.

Tools/Measure

The Universiti Sains Malaysia Personality Inventory (USMaP-i)

The Universiti Sains Malaysia Personality Inventory (USMaP-i) was used in personality screening to classify respondents into different trait of personality – extravert and ambivert. [31] The inventory was developed based on

the Big-Five personality factors (i.e. Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness), aimed to cater to sensitivity of population culture and value among Malaysian. The full version of the USMaP-i consists of 66-items with rating scales from 0 (very inaccurate) to 4 (very accurate). We only used the Extraversion properties (12 items from the 66 items) and using the following cut-off to determine the personality traits– extravert (scored of 33 to 48) and ambivert (scored of 17 to 32). In the current study, the internal consistency of the Extraversion sub-scale was excellent (Cronbach's alpha value of 0.82), indicated by 82 respondents.

Event Related Potential (ERP)

Event-related potential (ERP) is the electrical brain potential, indicated by the electroencephalogram motion in human brain, in relation to a definable sensory, cognitive, or motor event. It entails a series of peaks and troughs known as ERP components, measuring electrical potentials produced by the ion flow of extracellular fluid across cell membranes and the connection of neurons through neurotransmitter. [32] Event related potential (ERP) indicates the characteristic of high temporal resolution due to the monitoring of brain electrical activity with high precision. Accordingly, ERP is said as valuable technique for observing different electrophysiological components that represent the various cognitive stages in relation to theories of perception and attention, [32] as well as a potential tool in order to identify the electrophysiological components that represent the onset of cognitive dysfunction. [17] Please refer to the section of procedure for the ERP recording.

Procedure

After providing written informed consent, the participants provided demographic details, and undergoing Event Related Potential session that was held in The Magnetoencephalography and Clinical Event Related Potential Laboratory, Hospital of Universiti Sains Malaysia. Participants completed visual oddball paradigms in a counterbalanced order.

Visual oddball paradigm:

The visual oddball session consisted 240 trials. Prior to each trial, a fixation cross ('+') appeared for 300ms. Each trial presented a single stimulus at random for 1500ms; the stimulus could either be the standard stimulus, 'O', which was present in 180 trials (presenting about 75% of the trials), or the target stimulus, 'X', which was present in 60 trials (presenting

about 25% of the trials). The diagram of the oddball paradigm is shown in Figure 1 below. Participants pressed '1' on the keypad when they saw 'O' and '2' when they saw 'X'. All stimuli were 100mm x 100mm in size and were white against a black background.

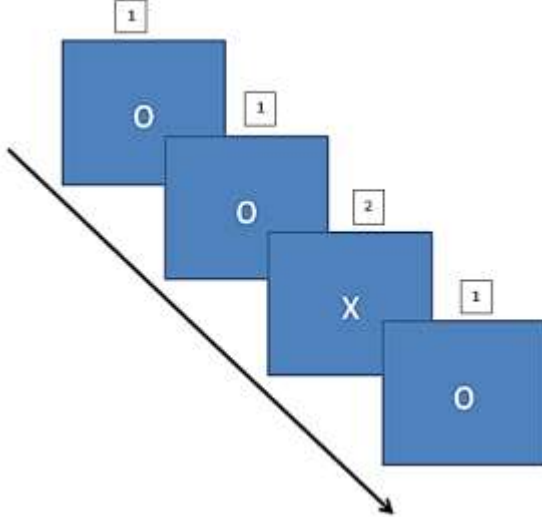


Figure 1: Schematic illustration of the oddball paradigm in Event Related Potential procedure

Event Related Potential (ERP) Recording

In the recording chamber, the participant was positioned 80cm in front of a 22" LCD screen monitor. A 128 HydroCel Geodesic Sensor Net (HCGSN) was applied symmetrically on the participant's head according to the standard 10-20 international electrode placement system. Net impedance was kept under 50k Ω and the data was digitised at 250 Hz. For the visual task, EEG data was recorded from electrodes Fz, Cz, Pz, C3, C4, T5, T6, O1, and O2. The recording was completed using the EGI Net Station 5.3 software.

EEG Pre-processing

The EEG data was subjected to 0.30-30.00 Hz bandpass filter and a 50 Hz Notch filter. EEG for correct responses during each session was averaged separately, and the ERP waveforms were phased locked to 100ms before and 1000ms after stimulus onset. For each EEG data file, ocular and movement artefacts were detected with sliding windows of 80ms and removed automatically, followed by bad channel replacement and averaging, after which the data was converted into the 10-20 montage and subjected to baseline correction. Subsequently, individual EEG data files were combined and averaged together. Statistical extraction was performed by the same software, and comprised of all amplitudes and latencies at the

aforementioned electrode sites for target and standard tones.

Following the extraction of ERP component, data was further analysed using Statistical Package for Social Sciences (SPSS) version 24 (SPSS Inc. Chicago, Illinois). Non-parametric test (i.e. Mann Whitney Test) was undertaken to analysis the raw EEG data, which is to determine the significant difference of P300 ERP component between ambivert and extravert

III. RESULTS

Sociodemographic Data

After excluding an excessively noisy dataset, the final sample size was 19 ambiverts (8 males) and 20 extraverts (12 males). The mean age (\pm standard deviation) for the ambiversion group was 22.1 (\pm 1.15) years and the mean age for the extraversion group (\pm standard deviation) was 22.7 (\pm 1.41) years. As the data showed non-normality, a Mann-Whitney U test was employed and revealed no significant age difference between the groups, $p > .05$. Mean personality scores on the USMaP-i (\pm standard deviation) for the ambiversion group and extraversion group were 28.95 (\pm 2.97) and 38.45 (\pm 3.87), respectively. A summary of the relevant sociodemographic data is shown in Table 1. The peak voltage between 300ms and 600ms after stimulus onset was regarded as the P300 component. Subsequent analyses employed non-parametric tests (Mann-Whitney U Tests) as the data was not distributed normally.

Table 1: Socio-demographic profile

Variables	Ambiverts	Extraverts
Gender (Male / Female)	8 / 11	12 / 8
Age (mean years \pm SD)	22 \pm 1.15	22.70 \pm 1.41
USMaP-i score (mean \pm SD)	28.95 \pm 2.97	38.45 \pm 3.87
Handedness (right / left)	18 / 1	16 / 4
Race (Malay / Chinese / Indian)	8 / 8 / 3	9 / 9 / 2

ERP Data for Visual Oddball Paradigm

At most brain region, there were no significant differences in P300 amplitudes between both extraverts and intraverts in the target tone condition and in the standard tone condition, most ps $> .05$. However, for target stimulus, P300 amplitude was

significantly greater at the frontal site (Fz) for the ambiversion group (mean = 5.41, SD = 3.60) as compared to the extraversion group (mean = 2.49, SD = 1.46), $Z = -3.37$, $P = .001$ (Table 2). For the P300 latency, there were no significant differences between ambiverts and extraverts, at all regions.

Table 2: Brain region in relation to personality factor (extraverts versus ambiverts) in cognitive process

Brain Region	Ambiverts (Mean±SD) [P300 Amplitude/P300 Latency]	Extraverts (Mean±SD) [P300 Amplitude/P300 Latency]	p-value [P300 amplitude/ P300 Latency]
Frontal	5.41±3.60/526.6±181.16	2.49±1.46/470.11±172.18	0.001*/0.473
Central	6.85±3.36/488.4±134.12	6.99±1.87/477.47±120.51	0.779/0.746
Parietal	6.85±3.36/477.2±115.00	5.58±2.06/472.42±101.65	0.261/0.910

SD=Standard Deviation

*Significant at $p < 0.01$

IV. DISCUSSION

The present study investigated the P300 component evoked in ambiverts and extraverts in response to visual stimuli in single-modality oddball tasks. The P300 amplitudes was found to be significantly higher at electrode Fz among ambiverts as compared to extraverts for both standard and target stimuli. Meanwhile, the latencies of P300 were similar across groups and conditions.

P300 in the Visual Oddball Paradigm

P300 amplitude has been shown to reflect allocation of attention, memory-updating and other cognitive processes whereas P300 latency reflects the time taken to evaluate or classify a stimulus before a behavioural response is generated. [33], [34] At large, the current study showed no significant difference in P300 latencies for both personality types in all conditions, showing that ambiverts and extraverts took as long to evaluate the stimuli.

Past studies found that P300 amplitude was more pronounced among introverts as compared to extroverts, due to different baseline cortical arousal. [18], [35] As ambiverts represent the intermediate between the two extremes, P300 amplitudes differences were expected. Brocke et al. [18] compared the P300 component elicited in extraverts and introverts, and found the greatest difference at the Fz electrode site where introverts showed a higher amplitude than extraverts. It appears that by virtue of being 'in the middle', the P300 component elicited by ambiverts in the current study resembled that of introverts and extroverts. It is worth noting that the P300 amplitude did not differ at other electrodes sites aside from electrode Fz, but not at the other midline electrodes (Cz and Pz) which typically recorded the greatest P300 amplitudes over the centro-parietal region. [15] While the P3a subcomponent cannot easily be delineated from P3b in a

classical oddball paradigms, its frontal distribution suggest that the difference in Fz P300 amplitude in the current study might point toward different degrees of automatic attentional capture by stimuli, [36], [37] otherwise known as the orienting response. [15] This is different from the P300 evoked at the centro-parietal regions (P3b) which reflected voluntary, sustained attention toward a stimulus. [15] Thus the current findings revealed that ambiverts might have a stronger orienting response than extraverts, but both personality groups were equally matched at voluntary attentional resource allocation. [15] This interpretation is also built on the spontaneous EEG data obtained by Brocke et al. [18] which recorded increasingly larger Alpha 1 power (7.5Hz - 10Hz) for extroverts throughout their study, whereas Alpha 1 power remained consistent for introverts. This meant that over time extraverts generally became less aroused, which modulated attention levels afforded to a task. [15], [38] This could have resulted in the extraverts' smaller P300 amplitudes in the frontal region in the current study. This is especially so when extraverts complete monotonous tasks associated with low arousal levels, [39], [40] such as the classical oddball paradigm employed in this study. Similarly, Von Gehlen et al. [41] showed that introverts were more able to focus in such monotonous tasks or in quiet conditions, whereas extraverts thrive in noisy environments or when completing complex tasks. Thus being 'part introvert and part extravert', the ambiverts in the current study could focus better than the extraverts at the oddball task. Reduced P300 amplitude at the Fz electrode site in extraverts could also suggest that mind-wandering or task-unrelated thoughts (TUTs) occurred more frequently among extraverts than ambiverts. Barron et al. [42] found that higher frequencies of TUT were related to diminished P3a and P3b amplitudes. [43] This showed that mind wandering decoupled the subject's attention from the external environment and redirected it to an internal train of thought, which dampens the brain's responsiveness to external stimuli. [42] While current findings only revealed differences at the Fz electrode, this could be because ambiverts shared enough similarities with extraverts for them to have comparable neurocognitive profiles even during TUTs.

In an fMRI study, Christoff et al. [44] also found that mind-wandering mostly activated the default network regions in the medial prefrontal regions, which might explain why the differences between extraverts and ambiverts in the current study was most significant at the frontal region. The relatively under-aroused extraverts were also more likely than ambiverts to

recruit the default network which underlies mind-wandering and TUTs, [45] thus hampering P300 amplitude.

Limitations and Strengths

The current study is limited by the simplicity of the experimental paradigms involved, which could not substantiate the ideas explored in the discussion section well enough. Tentatively, the current study proposed that ambiverts and extraverts differed in their orienting response in response to visual stimulus. This suggestion should be investigated in future studies by employing three-stimulus oddball tasks which are capable of delineating frontal and parietal P300. Including tasks with increasing levels of complexity or difficulty could also shed more light on the neurocognitive profiles of ambiverts and extraverts. Additionally, future studies should also take into account other psychological and biological variables that could potentially confound the P300 component. [46]

V. CONCLUSION

Few studies investigated the neurocognitive profile of ambiverts despite them representing the largest personality group. Using unimodal oddball tasks to investigate the P300 component, the current study revealed that both ambiverts and extraverts largely demonstrated similar attentional and memory-updating processes in response to visual stimuli. Importantly however was that ambiverts might have a stronger orienting response in comparison to extraverts in response to visual stimulus. This finding challenges the Eysenck Theory which suggests the superiority of extravert to experience better psychological well-being than non-extravert, [5] which, indeed signalling important implication to the society.

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Save Water, Save Earth Using Automated Agricultural Irrigation Method

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Abstract— Agricultural Irrigation is very essential for the production of crops. It is one of the important factors for the human to survive in his life. Irrigation is the method to plant the crops by water. Many methods of irrigation have been developed and are being practiced; but the selection of proper method of irrigation helps to improve the yield of the crops at an economical price thereby increasing the country's economy and development. Automated Irrigation is a modern technique, which saves 95% of the water and improves the production of crop. This paper proposes the different methods of automated agricultural operations, pros and cons of different methods, comparison between the traditional methods and modern automated irrigation methods.

Keywords: Agriculture, Irrigation methods, Automated Irrigation, Traditional Irrigation

I. INTRODUCTION

Agriculture in India is largely depends on natural rain and Irrigation based agriculture is proportionately smaller. Water being the limited natural resource, needs to be judiciously used. The dirt dampness based watering system control [1] utilizes Volumetric and Tensiometric procedures, which here are moderately straightforward however these sums are associated via a dirt water trademark twist which is particular to soil sort. Likewise the sensors utilized require routine upkeep for legitimate execution. Insightful programmed plant watering system framework [2] concentrates watering the plants frequently without the need of human checking utilizing a dampness sensor. With global warming and reduced rain in recent years, utmost significance has to be given for water conservation with improved crop yield and reduced labor. In the traditional methods of agricultural irrigation, there is lot of wastage of fresh water and also requires manual monitoring of the irrigation which insures additional labor and cost. The smart irrigation or automated irrigation system overcomes all the drawbacks of traditional irrigation system and helps in saving the precious natural resource, the water. The farmer can afford these techniques in his field so that manual monitoring of the agricultural field can be reduced. Even the farmer will come to know at what time he must put water to field. Finally, it provides the proper information to him about crops and saves his effort and time. Section II describes the Motivation of this paper. Section III portrays different types of traditional methods. Section IV describes the types of Modern Automated Irrigation Management System and Material Methods of the proposed framework. Section V describes the comparison between Traditional Methods and Modern Automated Irrigation Management System. Section VI discusses the

conclusion and future work.

II. MOTIVATION

Earlier the farmers used to undergo physically checking the field, and even they do not come to know at what time to irrigate and how much to irrigate by water. But by using Automated Irrigation method a farmer will get to know how much the temperature and humidity of climate. Based on these calculations he can irrigate his field in a better way which even he can improve his field in a profitable manner.

III. TRADITIONAL METHODS

Traditional Methods refers to monitor the field manually. Majority of the farmers are still using these methods. These methods are in less cost but takes time effort and maximum number of labors. There are many Traditional Methods of Irrigation which are as follows:

1. Check Basin Process: Here the entire area is separated into bowls or basins as indicated by the limit of water. Bowls are associated through like "Dhora" (A little deplete sort stream way), which seems like raised planet or earthen dividers on the both of sides. "Dhora" can be two sorts, one is the primary

"Dhora" and another is "Dhora" is associated with bowls. Size of bowls can be decided by the water flow. The advantage of this method is, it does not require any technical skills and is useful only in the case of levelled like fields, this can be disadvantage also.

2. Furrow Watering System Process: In this method, crops are grown in row wise. Most of the farmers go to this method because it takes less number of labors. Here the advantage is more area of the field is irrigated. But the disadvantage is water wastage is more in

this method. Even this process is not suitable for all types of crops.

3.Strip Watering System Process: Here the area is partitioned in to number of strips which are built depending on slope, width and structure of land. The pros of this process are even this method also requires less number of workers, more wastage of water is also not done. But it has limitation like it is not

suitable to different types of soils and crops.

4.Basin Watering System Process: This method is suitable for horticulture rather than crops. Here the benefit of this process as more number of trees can this method leads to wastage of water and not suitable for crops.

IV. MODERN IRRIGATION

Modern method of Irrigation is a very important technique to use in the field of agriculture. It helps to improve the economy of our country because agriculture is the main source of India. There are different methods of modern irrigation like:

1.Sprinkler Irrigation: This method can be used to sprinkle fertilizers. Here the water is sprinkled through the pipes in the form of drops. This is like natural precipitation. The advantages of this watering system are large area is irrigated, and then every crop gets water. No much Technical skills required by the Farmer. The main disadvantages are cost is more initially to have Sprinkler Irrigation, water may get evaporated due to more temperature. They can be permanent, temporary, semi-permanent. In permanent type the pipelines of main and branch are fixed permanently. In semi-permanent, the branch pipelines are placed outside the ground and main pipelines are placed inside the ground permanently. But in case of temporary both the branch as well as main pipelines is kept outside the ground and they can be adjusted in the field where ever the farmer wants to irrigate the land.

2.Drip Irrigation: This method of Irrigation has been used since ago. It allows the water to reach till roots of the plants or crops slowly. The main advantage of this method it saves water. Next is nutrients of the soil is not destroyed. But the cons are initial investment is more. During high temperature the sun rays will fall and damage of tubes can occur in drip irrigation[3].



Fig1 : Drip Irrigation in New Mexico vineyard, 2002[src]

3. Pot Irrigation: This method is more reasonable for ranges having sparse rainfall. In the saline ranges where stream watering system is not well suited, pot watering system strategy is effective. An earthen pitcher is utilized as apart of this technique. Pitcher is repaired in soil up to the neck.

4.1 Automated Irrigation Method

In this method, two components are used. One is wireless sensor unit and other is wireless information unit. Both of these are connected by radio transceiver where the values obtained from sensors are sent to micro-controller [8].

4.1.1 Material and Methods

This project uses an algorithm named as wireless sensor unit for checking the soilmoisture and temperature of the field which requires small micro-controller, humidity sensors, and temperature sensors. The project uses a microcontroller which can be Arduino which is programmed to receive an input signal of different moisture condition of the soil via the sensors. In this paper the DHT11 sensor is used to measure the moisture content of the soil and temperature. Then through a controller application we set the temperature and humidity to a particular value.

The algorithm steps are:

Step1: Start

Step2: Reads value from the sensors

Step3: Checks the threshold value

Step4: The values are sent to the microcontroller

Step5: If temperature is greater and less humidity

Step6: Then pump will on and water is supplied

Step7: The message will be sent to the farmer

Step8: Stop

4.1.2 Architecture

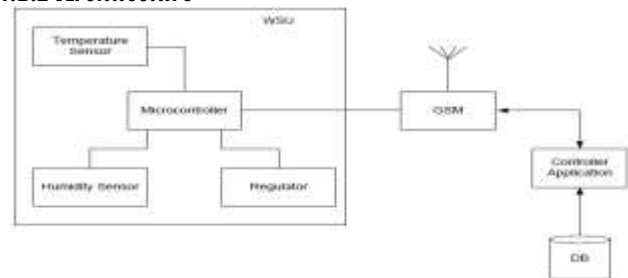


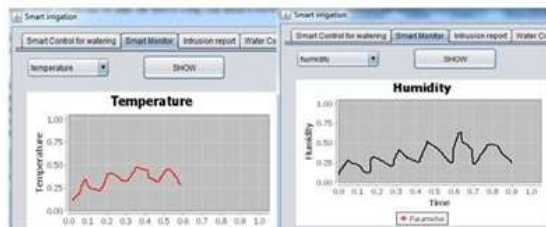
Fig2: Architecture of the framework

In this proposed framework, Arduino microcontroller is used which collects value from the sensors and sends it to the GSM gateway. Then the message is sent to the farmer about his field details. Through the controller application like laptop, result can be viewed which are stored in the database. Finally we can analyze the temperature and humidity variations with respect to time by graph.

V .COMPARISION

TRADITIONAL METHOD	AUTOMATED IRRIGATION METHOD
Requires manually monitoring the area of the farmer.	Does not require manually monitoring the area of the farmer.
Wastage of water is more in this method.	Wastage of water is less in this method.
The farmer does not get the knowledge of his field's condition.	The farmer will get to know the details of environment condition and irrigate in a proper manner
May or may not get benefited economically.	Gets benefited economically by knowing the soil details
Does not require any technical knowledge.	Here requires a less technical knowledge
Consumes time effort and requires maximum labors.	Minimizes time and labor effort.

Results



Snapshot 1: Graph of temperature of humidity

In the above snapshot, the values of humidity and temperature obtained from the sensor, send to the micro controller where it stores in to the mysql database. Then through the controller application we can see the graph of temperature and humidity.

VI. CONCLUSIONS AND FUTURE WORK

The objective of our paper is to have Automated Agricultural Irrigation Method which is one of the best ways to save earth. The IOT based automated agricultural irrigation system is cost effective, conserves water and reduces labor. By saving the natural resource the water for the next generation, we will be able to save earth. The electricity power is required to put on or off the pump which is required to irrigate the field. If any constraints in electricity then pump may not work. So for the future work we can use solar power technology rather than electricity which even helps to save electricity and use the natural resource.

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Determinants of Foreign Direct Investment in Saudi Arabia: A Review

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Abstract: - Foreign direct investment is identified as the major tool for the movement of international capital. Thus, the study has employed a review research to examine the determinants of foreign direct investment in Saudi Arabia. The results are significant as they have contributed towards determinants of foreign direct investment by comparing with previous studies. The results showed that trade openness, infrastructure availability, and market size play significant role in attracting foreign direct investment within a country. The inflow of foreign direct investment has a potential to benefit the investing entity as well as the host government. It also renders economic growth and socioeconomic transformation of the country. The flow of foreign direct investment in Saudi Arabia is affected by several factors including growth rate, GDP, exports and imports. It is the duty of the government to ensure the attractiveness of their country to maintain maximum flow of foreign direct investment, as it promotes sustained long-term economic growth by increased investment in the human capital.

Keywords: Foreign direct investment, Saudi Arabia, economic growth, economic transformation.

I. INTRODUCTION

Saudi Arabia is among the largest economies in the Middle East and North Africa (MENA) regions. Oil revenues in Saudi Arabia made about 90-95% of the total earning from export; therefore, economic development of Saudi Arabia positively depends on the oil revenues (Almubarak, 2009). Moreover, oil revenues are helpful to gain approximately 35-40% of country's GDP. The economic development of Saudi Arabia is pressurized in the form of diversification, liberalization, and reformation due to its heavy dependence on oil revenues (Wright, 2016).

Foreign direct investment (FDI) has been considered as the main vehicle for the movement of international capital. However, the flow of foreign direct investment and capital has occurred in different; and sometimes, in opposite directions. For instance, the flow of foreign direct investment from United States to Western countries is similar to the sizable purchases of United States assets by the national European citizens. This type of interflows in the country cannot be explained through the traditional theory of international movement of capital. Therefore, markets need to provide efficient way of transferring capital for securities, under competitive conditions. The national enterprises within a country are capable of operating at lower costs as compared to the subsidiaries of foreign enterprises. Therefore, the determinants of direct investment need to be in actual deviations apart from the competitive conditions (Chaudhuri & Mukhopadhyay, 2014).

The superiority of the firms is explained on the basis of product cycle theory because the historical patterns of foreign direct investment cannot be defined through the advantages of superior knowledge. The imperfections in stock markets are neglected, which may result in discrepancies between the expected rate of returns and risks associated with the investment. The foreign direct investment equalizes the rate of return for the companies that are at financial risk (Zhang & Lei, 2014). The FDI is stimulated to a strong currency area by the exchange risks. However, the overvaluation of dollar as compared to other currencies has provided substantial incentive for the foreign direct investment.

The FDI is represented as any investment in a country that is carried out by some private entities. Moreover, majority of the foreign direct investments are rendered by the multinational companies in the developing countries. It is responsible for narrowing the gap between the targeted investment and locally mobilized savings due to technological advancements. It also narrows the gap between net export earnings, targeted foreign exchange needs, and net foreign aid. The availability of different resources is the driving force behind direct investments in Saudi Arabia because of the new emerged markets and growth potential in various regions. Other factors utilized as driving force for foreign direct investment include; change in market dynamics and competition (Alvarez & Marin, 2013).

The multinational corporations render foreign direct investments by providing resources like; entrepreneurial capabilities, management experience, and technological skills, which are easily learned through various training programs. The FDI helps in the integration of economies at the phase of production in the globalized world economy through various factors including; technology, capital, access to foreign markets, and managerial skills (Badr & Ayed, 2015). However, the natural resources and assets like research and development are accessible to the foreign direct investments. In terms of FDI, Saudi Arabia possess favorable and unfavorable factors. For instance, poor business policies and increased level of unemployment render unfavorable conditions; whereas, the oil availability has been considered as a contributing factor towards investment.

Saudi Arabia renders similar benefits, incentives, and guarantees to the foreign investors and Saudi Arabian companies. The investors are permitted to remit their funds abroad by 15% reduction in the taxes for the foreign companies, which render a profit of around 100,000 Saudi riyals (Abdulrahim, 2015). The foreign direct investment is known as a significant tool for development in different countries. It not only results in improvement of capital formation, but it also enhances the balance of payment and creates job opportunities within the host country (Abdulrahim, 2015). According to Rachdi and Saidi (2011), foreign direct investment has stimulated economic growth in the developing countries.

Different policies are focused for the promotion of investment and privatization to achieve the desired reforms and liberalization. In Saudi Arabia, private investment has been encouraged widely. It has led to the introduction of foreign direct investment as a significant aspect to revitalize the country's economy and diversification of its productive base. These services rendered to the manufacturing and other sectors that positively influence the income, production, and employment within a country. This study has highlighted the determinants of foreign direct investment that prevails in Saudi Arabia. The role of market size, returns, and country risk in attracting foreign direct investment, economic integration through international trade, and the wage rates have also been analyzed. The study has aimed to investigate the determinants of foreign direct investment in economic development of Saudi Arabia.

II. LITERATURE REVIEW

The FDI prevailing in Saudi Arabia, has been assumed among three forms of investment that include greenfield investment, joint ventures, and investments associated with the offset programs (Almubarak, 2009). Joint ventures developed between Saudi government and the companies were dominant prior to the New Investment Law. The offset program in Saudi Arabia has been associated with its foreign partners. Saudi Arabia tends to focus on the development and diversification of its national economy, which is responsible for the long term economic growth of the country (Abdulrahim, 2015).

The countries, receiving increased inflow of foreign capital, experienced faster economic growth as compared to the countries receiving decreased inflow of foreign direct investment. However, the concept of foreign direct investment and its impact of economy of Saudi Arabia have not been analyzed. The participation of foreign investment firms in Saudi Arabia started in 1960s; but by the year 2000, it increased to 100% of their investment (Moser et al., 2015). Therefore, it is believed that the foreign direct investment positively affects the country socially, culturally, and economically.

The globalization across the world has increased rapidly due to the technological advancements. It has led to growth of the interdependence among different countries, and the countries seek new markets to cope up with the growing competition. The internal and external factors of different companies have triggered the expansion of new markets. The external factors that are responsible for this expansion include; unsolicited orders, foreign market opportunities, and declining home market of the country. Whereas, the internal factors affecting the expansion of new market are; marketing advantages, risk diversification, economies of scale, and excessive resources (Abdulrahim, 2015).

Saudi Arabia has gained much advantage from the foreign direct investment just like other developing countries. The role of FDI in Saudi's economic growth was analyzed by Ramaday et al. (2007). The results of the study depicted that Saudi Arabia has made significant efforts to attract foreign investors. The foreign direct investment has created employment opportunities and increased GDP in Saudi Arabia. Moreover, the leaders and managers in Saudi Arabia have welcomed the concept of foreign direct investment as a great benefit for the country's

economy. The foreign firms greatly affect the behavior of consumers in the host country, when the foreign firms tend to introduce their new products. However, the foreign direct investment has created a new infrastructure and employment opportunities for the citizens of Saudi Arabia. The significant factors that attract foreign direct investment in the Arab countries include; trade openness, right infrastructure, and quality of institutions within the country (Abdulrahim, 2015). An important role has been played by the overall economic performance of Saudi Arabia to attract maximum foreign direct investment. The impact of FDI in countries is reflected through different ways of government by which they attract the investors into their country. Therefore, it is believed that foreign direct investment has the ability to exhibit trade sensitivity. The flow of foreign direct investment in Saudi Arabia is significant as it helps in achieving stability, growth, and self-reliance.

2.1 Influence of Foreign Direct Investment on Country's Economy

Foreign direct investment is responsible for laying foundations that assist the economic growth and generate domestic savings and foreign currency. It helps in the reduction of commodity prices by improving the quality of national products through the transfer of advanced technology in the developing countries (Johnson, 1972). The FDI has proved to be more conducive for economic development and long run growth, apart from the capital inflows. A study investigated positive association between GDP growth rates, reliability of infrastructure, and flow of foreign direct investments. The regulatory framework of host country serves as a significant predictor of level of foreign direct investment (Neda Abdulaziz, 2009).

FDI also brings foreign management skills and technology, which is adapted by the host country. However, more foreign direct investment is attracted by the countries with growing economies. The flow of FDI increases among the countries interested in providing services or goods to the emerging markets. The investors of foreign direct investment are mainly concerned about the inflexible regulations, political instability, and poor development indicators within the country (Walsh & Yu, 2010). The emerging markets are observed to possess increased inflation rate, lower development indicators, and poor institutions.

Increase in foreign direct investment is associated with larger markets in the host country, depending on the increased potential demand and decreased economies of scale. However, higher foreign direct investment decreases the openness because the investing companies get benefits

from circumventing trade barriers via various production sites (Sbia et al., 2014). Foreign direct investment is attracted by the export orientation, which positively affects the trade within the country. The inflow of foreign direct investment is increased when the currency of host country is weak, which makes the assets of host country cheap relative to the assets within the home country. The main concerns of potential foreign investors are the macro-economy and political stability of the country.

An efficient government system is positively associated with higher economic growth, which attracts maximum foreign direct investment within the country. However, corruption is aided by the poor institutions, which causes reduction in the profit and increase the rate of investment. The investors become sensitive to uncertainty like political uncertainty due to poor institutions as a result of high sunk cost of foreign direct investment.

2.2 Determinants of Foreign Direct Investment

The foreign direct investments help to achieve rapid economic growth within developing countries by narrowing the gap between investments and domestic savings and bringing the latest technology from the developed countries. The developing countries are not considered as favorable destinations by foreign investors as compared to the developed countries (Mottaleb & Kalirajan, 2010). The countries that possess increased GDP growth rates, business friendly environment, and high proportion of international trade are more likely to attract maximum foreign direct investment. The determinants influencing the flow of FDI include:

- **Economic environment:** The economic development, economic structure, and abundance of natural resources are considered as significant factors for maximum attraction of foreign direct investment.
- **Policies of the country:** It is believed that the rules, regulations, laws, and other policies of the country significantly affect the foreign direct policy.
- **Policies of industrial sector:** The policies prevailing in the industrial sector of a country greatly affect the trends of investments in the developing countries.
- **Political factor:** It plays an important role in political stability of the country as it assists the direction and effect foreign direct investment within a country.

The capital flow within a country has been considered as the key feature of current financial crisis prevailing in the emerging markets. Therefore, the developing countries extensively depend on the FDI as compared to other sources of finance. The level of country's productivity is affected by the macroeconomic environment and maintenance of macroeconomic stability is a great challenge for the developing countries (Iqbal, 2001). The

factors that determine the foreign direct investments across different countries are employed with different econometric specifications. The foreign capital received by the countries in the form of foreign direct investments is significant for the economic growth and development of the country (Flora & Agrawal, 2014).

III. DISCUSSION

The study has highlighted different determinants of foreign direct investment. The stability of exchange rates, dealing with official bodies, obtaining investment licenses, custom exemptions, and grants to tax investors significantly depend on the foreign direct investments. The global flow of foreign direct investment has risen by 16% to USD 1,524 billion in 2011 from USD 1,309 billion in 2010 (Flora & Agrawal, 2014). The FDI benefits the recipient country economically by providing it foreign exchange, technology, and capital. It increases the competition between different countries and helps to gain access to the foreign markets. The two approaches associated with the investigation of foreign direct investment and economic growth includes; time series approach and production function approach (Harms & Ursprung, 2002). Moreover, economical and positive role is played by the trade openness, institutions, and GDP size on the inflow of foreign direct investments. On the contrary, a study revealed that strong association between inflow of foreign direct investment and economic growth does not indicate that increased amount of investment would result in a rapid growth of the country's economy (Choe, 2003).

A study conducted by Pradhan (2009) revealed 2 way link between economic growth and foreign direct investment. For instance, increased inflow of FDI stimulates economic growth within the host country, which eventually attracts more flow of foreign direct investment. A positive correlation is observed between economic growth of the country and flow of foreign direct investment. A country undergoing consistent, but steady positive economic growth has been proved as an attractive destination for the investors as compared to the countries experiencing moderate to slow growing economy. Although, the economic growth and foreign direct investment are

positively correlated, but the host country needs to attain a specific level of development, which helps to achieve high levels of productivity (Flora & Agrawal, 2014). Rogmans and Ebbers (2013) tested the determinants of foreign direct investment and revealed that the flow of FDI is negatively affected by the energy endowments. The oil prices, openness to trade, and GDP are positively associated with the inflow of foreign direct investment. However, the countries, which possess large amounts of gas and oil, have certain institutions and policies that inhibit the flow of foreign direct investment within the country.

According to Lui et al. (2006), there is a positive factor for the economic growth rate within a country, which suggested that increased rate of economic growth tends to attract more FDI. Another study revealed the association between economic growth and foreign direct investment, and stated that developing countries are capable of attracting more investments as they possess investment friendly policies and high rate of economic growth (Mottaleb, 2007). The evaluation of correlation between economic growth and foreign direct investment together with the role of financial sector revealed that there are strong, positive, and significant effects of investments on economic growth of the developing countries. Roy and Mandal (2012) conducted a study to investigate the impact of foreign direct investment on the economic growth of countries by utilizing the co-integration approach between the years 1990 and 2011. The results revealed that there is a positive correlation between GDP and foreign direct investments.

Carkovi and Levine (2002) investigated the association between economic growth and flow of foreign direct investment within 72 countries. The results revealed that there is no independent impact of foreign direct investment on the economic growth of developing and developed countries. Moreover, Duasa (2007) stated that foreign direct investment does not contribute towards economic stability of the country. However, the correlation between economic growth and foreign direct investment may vary across the economies of different countries on the basis of time considered for conducting the analysis. The present study has contributed new information to the international business literature, particularly focusing on the association between foreign direct investment and economic growth.

The economic development and growth are induced as a result of increased foreign direct investments.

However, if economic growth tends to attract foreign direct investment, then it is necessary to implement various policies to attract maximum investments. Amri (2016) investigated bi-directional linkages between the foreign direct investment, energy consumption, and gross domestic product per capita in the developed as well as developing countries. The foreign direct investment was improved by 0.185% with an increase in 1% rate of the renewable energy. Eventually, increase in FDI is responsible for enhancement in renewable energy by 0.292% (Amri, 2016). Another study revealed that a non-linear relationship exists between the foreign direct investment and measure of market income and size.

The study has yielded various insights about attracting foreign direct investment within a country. The FDI strongly depends on the country's macroeconomic stability, institutional quality, and level of development. The determinants of foreign direct investment are observed to be different among the emerging and advanced economies. More services regarding foreign direct investment are attracted on the basis of independent judiciary and effective infrastructure within the country. The significant gravity variables associated with foreign direct investment are parent-country per capital GDP, cultural factors, trade agreements, and labor endowments.

The foreign investments are considered as a significant part of country's economic growth. The positive effects of FDI on labor, product, capital market, and technology are responsible for its attraction within the developing countries. FDI is considered as a rich source to generate income through technological advancement, management skills, market proficiency, governance measures, and inflow of capital. It is necessary to fabricate favorable policies to attain economic growth through maximum flow of foreign direct investments, especially in the transition phase. In order to encourage different potential sources of economic development, efforts are needed to enhance and stimulate the foreign direct investments.

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Nursing Students' Readiness for e-Learning Experience

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Abstract- This study aimed to assess readiness of nursing students for e- learning in El Dawadme Applied Medical Science, Shaqraa University.

Methodology: Cross sectional, descriptive research design was used to investigate readiness of nursing students for e-Learning among a purposive sample of 113 female nursing students. Tool; the data were collected by using two tools. The first was concerned with collecting data related to sample characteristics; the second was a self-administered questionnaire, concerned with assessing the students' readiness for the e-Learning.

Results: The study found that the majority of nursing students revealed total high score level of e-Learning readiness. Watching through each subscale, the average score was high, especially; Technology Acceptance's average score was the highest. The Motivation average score was the lowest. Further, the study found that nursing students of different academic level (3rd to 8th level) showed statistically indifferent average score of e-Learning readiness while, those with different preference to study through e-learning, showed statistically different average score of e-Learning readiness.

Recommendation and implications: The findings show that applicant nursing students are ready for e-Learning. The implementation of new technologies with instruction should be made. The e-Learning is a tool that can be used in undergraduate nursing education. Therefore, the University should develop e-Learning as a medium to enhance learning for students as they are ready to learn on their own, whether what year they are at or what age they are. There are no barriers to learning through e-Learning anymore.

Key words: e-learning; Nursing students; Readiness for e-Learning.

I. INTRODUCTION

The advancement in information technology and the Internet over the past decade leads to new educational delivery methods like e-Learning [1]. e- Learning is becoming a significant approach of supply education in higher education institutions. The need for a well-educated and appropriately trained staff has motivated many higher education institutions to reform their education systems [2, 3]. e- Learning is becoming a worldwide delivery mode for education and training in many educational institutions. It provides a diversity of learning styles that have been broadly known in many countries and institutions. It has also become a vital and valid learning process for health care professionals in the 21st century [4]. Introducing the e-Learning in nursing curriculum is important, as it allows learners to learn in their own time and place. Moreover, while it allows learners to be self-directed, it also provides them with the ability to connect online to download resources that are essential for their educational requirements [5]. It holds a number of potential benefits for the learner, including access to learning tools and resources which include text, audio and video, e-mail, online discussions, and evaluations. It is a useful tool for enhancing the quality of teaching and learning. It is an

“innovative approach to education delivery via electronic forms of information that enhance the learner's knowledge and skills. [6]. Zhang and Nunamaker [7] define “e-Learning as learning that takes place anytime someone uses electronic means for gathering information that is acquired without another live person present”. Arbaugh [8] defined e-Learning as the use of the Internet by users to learn specific content. Other researchers define it as using modern Information and Communications Technology (ICT) to deliver instruction, information, and learning content [9]. Currently the challenge in nurse education is to make programs convenient, reachable and smart to a broader cohort of students [10]. In nursing education, the move toward integrating distance education and Web-based learning into curricula continues as students and faculty experience the effects of distance education technologies on teaching and learning [11]. Just as in classroom settings, nursing programs delivered by distance education can involve students as co participants who shape learning through inquiry. IT skills and continuous student support is helpful [12]. Advantages of e-Learning for learners include an increase accessibility to information, better content delivery, personalized instruction, content standardization, accountability, on-demand availability, self-pacing, interactivity, confidence, and increased convenience [13-15]. In addition, it

increased student satisfaction [16,17] and reduced staff workload [10]. In addition, students appreciate the flexibility and convenience of being able to work in their own time and location without the need to travel [18,19]. Welsh et al. [14] concluded that e-Learning has enormous benefits and can reduce costs in comparison to a traditional classroom environment after primary course establishment. It reduces classroom and facilities cost, training cost, travel cost, printed materials cost, and labor cost [13,14]. Anywhere e-Learning initiatives necessitate significant funds in technology such as hardware costs, software licenses, development of learning material, equipment preservation, and staff training [14,20]. Despite these benefits, e-Learning has a greater drop-out rate than traditional delivered education [15]. This may be because there are disadvantages for e-Learning such as learners need to have access to a computer and the Internet. They required having computer skills with programs such as word handling, Internet browsers, and e-mail communication. Slow internet connections or older computers may make gain access to the course materials hard—this may cause the learners to get upset and give up [21]. Another disadvantage of e learning is that students may feel isolated from the instructor. Learners also need to have good writing, computer, and communication skills. When instructors and other learners are not meeting face to face, it is possible to misunderstand what was intended [22].

While registration in online courses continues to magnify, the issue of student retaining takes on importance [23]. Information system research clearly shows that user satisfaction is one of the greatest significant issues in assessing the accomplishment of system application. Student success in online course has been linked to three factors: Student readiness; Student orientation; and Student support [23]. Borotis et al. [24] define e-Learning readiness as “the mental or physical preparedness of an individual for some e-Learning experience or action.” Research has shown that it is essential to conduct a readiness assessment before the implementation of e-Learning [25]. Additionally, e-Learning teachers and designers can help their prospective learners prepare for, or at least evaluate their own readiness to learn within an online environment. Research supports that this is a critical consideration, since an individual learner's success in an online course often depend on this foundation of readiness. Learners who are arranging to take a course or program on-line are guided to measure their own readiness to effectively learn in the computer-generated situation. Readiness requires three dimensions to be evaluated: the learners' computer or technical skill, learning skills, as well as their time management behaviors [26]. Thus e-readiness evaluation

allow enablers and rule producers to take appropriate policy measures and implement development plans that help in creation of informed participants in e-Learning actions. Further, such assessments offer key information to educational institutions to provide options that can tailor to the specific needs of each learning group [27].

Significance of Study

In spite of increasing numbers of educational institutions which are adopting an online approach to teaching and learning however, slight concern has been given to the pre requisite personal and technical qualities required for academic achievement and satisfaction within this environment [28]. King Saudi Arabia (KSA) needs graduates who are prepared for the place of work and who have a high level of knowledge and confidence in the use of technology to help them in their lifetime learning. Since e-Learning is conducted using the Internet and World Wide Web, the learning environment becomes more complicated [29]. In addition, little is known about why many users stop their online learning after their first experience. Questions remain regarding both the instructional accuracy of e-Learning as well as the readiness of learners to engross in online learning environments. Little is reported about students' readiness for e-Learning experience in Saudi Arabia to date. So the aim of this study is to assess nursing student's readiness for e-learning.

II. METHODOLOGY

Aim of the study

The present study aimed to assess readiness of nursing students for e- learning experience in El Dawadme Applied Medical Science, female branch, Shaqraa University.

Study design

Cross sectional, descriptive research design was used to investigate the aim of this study.

Setting

The study was conducted at the nursing department in faculty of El Dawadme Applied Medical Science, Shaqraa University, Saudi Arabia.

Subjects

A purposive sample of 113 female nursing students from the department of nursing, faculty of El Dawadme Applied Medical Science, female branch, Shaqraa University was enrolled in this study. The majority of student in each level and all levels in the first semester of the academic year 2013-2014 were included in this study except the first and second levels were not represented. It comprised 9 students from 8th level 30 students from 7th

level, 16 students from the 6th level, 23 students from the 5th level, 7 students from the 4th level, and 28 from the 3rd level.

Tool of Data Collection

The data were collected by using two tools.

The first tool

It is concerned with collecting data related to student academic level, if she has previous experience with e-learning, and if they prefer to use E-learning in their nursing study or not.

The second tool

It is e-Learning readiness assessment which is a self-assessment tool developed by Watkins et al. [30]. The tool is translated into Arabic language by the researcher and used in order to assess readiness of nursing student to engage in e-Learning experience. It consisted of 27 statements related to readiness for e-Learning success, which were grouped into 6 subscales: (1) technology access (3 items), (2) online skill and relationships (9 items), (3) motivation (3 items), (4) online audio / video (3 items), (5) internet discussions (4 items), and (6) importance to your success (5 items). For each statement participants completed a 5-point Likert-type scale response ranging from "strongly disagree"=1 to "strongly agree"= 5 with the statement. The average of the e-Learning readiness includes 5 levels: the average from 1.00 to 1.49 is least, average from 1.50 to 2.49 is less, average from 2.50 to 3.49 is fair, the average from 3.50 to 4.49 is high, and average from 4.50 to 5 is the highest. The reliability of the e-Learning readiness assessment tool for this study was reported to be 0.85 [30].

Pilot Study

A pilot study was carried out on 10 students to test the clarity and simplicity of the questions. Necessary modifications were done. Students who shared in pilot study were excluded later from the main study sample.

Methods

- A review of national and international related references was carried out to get acquainted with the various aspects of the research problem and the study tools.
- Data were collected through interviewing the respondents. Each respondent took 5-10 minutes to complete the questionnaire.
- He study questionnaire was distributed at the first semester of the academic year 2013-2014.

Statistical Analysis

He Statistical Package for the Social Sciences (SPSS) version 15 was used to analyze the data. Frequencies and percentages were calculated for study sample characteristics. Descriptive statistics, including, measures of central tendency and means were calculated for each subscale and total score of e-Learning readiness scale. One way analysis of variance was used to compare e-Learning readiness among different students groups. He students were grouped according to their academic levels and their preference to study through eLearning. Table 1 shows the distribution of subjects according to their demographic characteristics. As shown the sample consisted of 113 students; more than the quarter of the sample (26.4%) from the 7th level and the majority of the sample 90.3% did not have past experience with e-learning. Slightly less than half (42.5%) of the sample not prefers to use E learning in their nursing study while about the third (31.9%) prefer. Table 2 represents the mean and standard deviation of e-Learning readiness for all nursing students participated in the study. As shown the majority of nursing students demonstrated total high score level of e-Learning readiness (3.75 ± 0.67). Looking through each subscale, the average score was high, especially; Technology Acceptance's average score was the highest (4.1 ± 0.89). He Motivation average score was the lowest (3.4 ± 0.88). Table 3 represented the analysis of differences in readiness for eLearning among different student levels. As shown the participant nursing students of different academic level (3rd to 8th level) showed statistically indifferent average score of e-Learning readiness ($F=2.325$ and $P=.103$). While, those with different preference to study through elearning, showed statistically different average score of e-Learning

Characteristics	Frequency	Percent
Student Level		
Third level	28	24.8
Fourth level	7	6.1
Fifth level	23	20.4
Sixth level	16	14.2
Seventh level	30	26.5

Eighth level	9	8.0
Total	113	100.0
Past Experience with e- Learning		
Yes	11	9.7
No	102	90.3
If they prefer to use e-learning in their nursing study		
Yes	36	31.9
No	48	42.5
I don't know	29	25.7

Table 1: represent frequency and percentage of study sample characteristics.

e-Learning readiness	X	S.D	Degree
Technology Acceptance	4.1	0.89	High
Relationship and Online Skill	3.77	0.83	High
Motivation	3.4	0.88	Fair
Online Audio / Video,	3.73	0.94	High
Internet Discussions	3.69	0.93	High
Importance to your success	3.81	0.78	High
Total average	3.75	0.67	High

Table 2: Mean and standard deviation of e-Learning readiness for all nursing students participated in the study (n=113).

Student level	DF	SS	MS	F	P Value
Between Groups	2	2.051	1.025	2.325	.103
Within Groups	110	48.520	.441		
Total	112	50.571			

Table 3: The Analysis of differences in readiness for e-Learning among different student levels.

Table 4 represented the analysis of differences in readiness for eLearning among different student groups according to their preference to study through e-learning.

Preference to study through e-learning	DF	Sum of Squares	Mean Square	F	P Value
Between Groups	2	3.044	1.522	3.522	.033
Within Groups	110	47.527	.432		
Total	112	50.571			

Table 4: The Analysis of differences in readiness for e-Learning among different students groups according to their preference to study through e-learning.

As shown the participant nursing students of different preference to study through e-Learning, showed

statistically different average score of e-Learning ($F=3.522$ and $P=.033$).

III. DISCUSSION

Nowadays, e-Learning is a common transport media for education and training within many organizations. Yet, while both the supply and demand for e-Learning opportunities has increased in recent years, many professionals are beginning to inquiry whether e-learners are prepared to be successful in an online learning environment [31,32]. After all, a learner's demonstrated success in a conventional education and training classroom may not be an adequate predictor of success in an e-Learning classroom. One way of measuring a potential online learner's readiness is through self-assessment. So this study aimed to assess readiness of nursing students for e- learning experience in El Dawadme Applied Medical Science, Shaqraa University. The funding of the current study documented that, only less than the third of participants prefers to use E learning in their nursing study inspite of they scored high in their total score for e-learning readiness. This may be due to lack of information and awareness related to e-learning process and requirement among study participants and the majority of them had no previous experience in using e- learning and may be scared to pass with uncertain experience. This was in contrast with the results of Iwata et al. [33] they have been conducting surveys to investigate their medical and nursing students' needs and readiness for e-learning. Their result found that most of the participant students prefer to use computers or the Internet for their English study. While, Abdelaziz et al. [34] reported that lack of computer skills of students affected their abilities to communicate effectively with the instructor and failed to participate in a diversity of online communication methods. Students in the study group were satisfied with the e- Learning program as a teaching method, but they did not wish to take another e-Learning program except if they had computer and Internet at home. Wattakiecharoen et al. [35], found in their study that, the mean score of Ph.D. students who are ready for e-Learning is high and as the analysis of each aspect is high, whereas technology acceptance is the highest and the motivation average score was the lowest. This was in agreement with the findings of the current study in which the majority of nursing students demonstrated total high score level of e-Learning readiness. Looking through each subscale, the average score was high, especially; Technology Acceptance's average score was the highest while the Motivation average score was the lowest. This also may be due to the availability of computer, cell phone, and internet in their home and using it in searching and chatting. Also

introduction of computer courses in preparatory and secondary school may be contributing factors. In addition, the more experience a student has in using basic computer skills (use of networks, word processing and other software applications, ability to upload and download files, use of the world wide web and email, accessing online library and other resource databases, and experience with online forums and other discussion applications), the more ready they are to take an online course. Other foundational requirements include access to a stable Internet connection and dependable computer and printer. Additionally, the findings of the Tibi, [36] supported the present study findings. Also current study findings partially supported with Coopasami and Knight, 2014 findings. They had conducted study to assess the readiness of nursing students to make the shift from traditional learning, to the technological culture of e-Learning. They found the following; the psychological readiness score was noted to be high in the "could be worse" category (pre-72%, post-64%). The technological readiness score was noted to be in the "dig deeper" category (pre- 58%, post- 65%) whilst the equipment readiness score fell in the e-Learning "not ready category" (pre- and post- 68%). Furthermore, the study found that nursing students of different academic level (3rd to 8th level) showed no statistically different average score of e-Learning readiness while, those with different preference to study through e learning, showed statistically different average score of e-Learning readiness. These findings were supported to some extent with the findings of Wattakiecharoen et al. [35-39]. They found that PhD. students of different year (1st year, 2nd year and 3rd to 6th year), different ages, different gender, different discipline (nursing management, hospital management, public and private management, educational administration) and different experiences in using computers (with experience-no experience) showed statistically indifferent average score of e-Learning readiness.

IV. CONCLUSION

The findings show that participant nursing students are ready for e- Learning. The implementation of new technologies with instruction should be made. The e-Learning is a tool that can be used in undergraduate nursing education. Therefore, the University should established e-Learning as a tool to enhance learning for students as they are ready to learn on their own, whether what year they are at or what age they are. There are no obstacles to learning through e- Learning anymore.

Study Limitations

Small sample size and data were collected only from female nursing students are the major limitations of this study because it hinder the generalizability of the findings.

Relevance to Practice

An appraisal of e-Learning readiness is essential for its successful application. Success in e-Learning can be achieved by understanding the needs as well as the readiness of students in a specific e-Learning environment. This study aimed to assist lecturers to prepare students for the shift to e-Learning in the classroom.

Recommendations

- The motivation subscale mean was the lowest among others subscales yet; it was fairly acceptable which indicate that the faculty administrators and faculty staff need to apply approaches and strategies to improve and magnify the internal and external motivation of nursing students.
- It is healthier to assess student readiness for e-Learning before starting any on-line program.
- Students need clear guidelines and preparation prior to starting any on-line program.
- The establishment of on-going technical support could be regarded as a critical service to enable continuing success of learners in e- Learning environment.
- Further studies needed to investigate why nursing students not motivated to engage in e- learning in spite of their high level of their readiness for this experience.

Ethical Considerations

An ofcial permission was obtained from the faculty vice dean. Oral informed consent was taken from potential participants aier explanation the purpose and procedure of the study. Students were informed that their participation is voluntary and assured that their responses will be confidential will not aject them, and used only for the research purpose.

Conflicts of Interest

He authors declared no conflict of interest.

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Restoring Motor functions in Spinal cord injury, Hemiplegic Cerebral Palsy, and Stroke by Botulinum toxin-induced Synaptic Competitive-Learning Therapy

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Abstract- Botulinum toxin (BoTx) is well known as a popular drug of choice for spasticity relief. Recent research shows that the toxin has synaptic competitive-learning (SCL) restoring plasticity properties acting at peripheral and central nervous sensory-motor centers. In the intact brain, SCL is naturally-endowed, that controls-regulates all learn-register-recall-execute (motor) functions, and memory storage functions during development and throughout adult life. In spinal cord injury (SCI), hemiplegic cerebral palsy (HCP), and stroke, there is partial/complete cessation of all SCL mechanisms in those injured and denervated centers. The denervated synaptic fields soon become reinnervated by spontaneous growths of aberrant, maladaptive synaptic weights. The massive loss of neurons in the injured site/s and the resultant synaptic weights (=defined as learned motor experiences stored as memory weights) distortions in the denervated centers cause spasticity and sensory-motor paralysis. It is known that BoTx spasticity relieving effects in single, isolated muscle/s are short-lived. However, clinical studies indicate that when given to multiple spastic muscles in serial/ repeats, BoTx generates significant recovery. Basic science studies show that BoTx generates neosynaptogenesis at motor-endplates, on spinal motoneurons and motor cortex. It reinstalls the three cardinal courses of SCL viz. initial redundant connections, activity-dependent, competition-based pruning-selection refinement of connections at these sites. This paper presents i) a cognitive systems perspective of spasticity and motor paralysis, ii) a low-dose, multi-muscles BoTx treatment protocol designed to keep its paralyzing effects minimized, while prolong its SCL duration in order to initiate and consolidate long-lasting motor recovery in these disorders.

Key words: Acetylcholine (Ach); Botulinum Toxin (BoTx); Hemiplegic Cerebral Palsy (HCP); Motor recovery; Spinal Cord Injury (SCI); Stroke; Synaptic Competitive-Learning (SCL); Neurorehabilitation; Traumatic Brain Injury (TBI).

I. INTRODUCTION

Botulinum toxin (BoTx) is well known as a popular drug of choice for spasticity relief [1-3]. Recent research shows that BoTx has synaptic competitive-learning (SCL) restoring properties that act at neuromuscular, spinal cord, and central nervous sensory-motor centers [4-6]. Contemporary research in sensory-motor cognitive systems indicate that in SCI, HCP, and stroke the motor paresis/paralysis, and spasticity is caused by partial/complete disruption of all SCL mechanisms in the injured and denervated target neuron centers synaptic fields [5-7]. In the intact brain-cord, SCL is naturally-endowed, that controls-regulates all sensory-motor learn-register-recall-(motor) execute functions, and memory storage functions during development and throughout adult life. SCL consists of an initial redundant numbers of synaptic connections, muscles activity-dependent, competition-based selection of appropriate connections and pruning of inappropriate ones. Basic science research shows that

BoTx has SCL-restoring properties that act transiently (weeks) at neuromuscular synapses, spinal cord motoneuron pools and the motor cortex [4-7]. Until now BoTx use in motor paralytic disorders is limited to spasticity/overactivity relief in isolated limb muscles and in dyssynergic bladder-sphincters. BoTx administration into spastic/ overactive muscle causes transient blockade of Ach release from the motor axon terminals, and extensive sprouting of the terminals; the paralyzing effect lasting 3-5 months [1-3,8,9]. This paper explains the SCL-restoring properties of BoTx acting at neuromuscular synapses, spinal motoneurons-interneurons and at the cerebral motor cortex [5,10,11] and presents a low-dose, multi-muscles, serial/repeat BoTx treatment protocol designed to prolong the SCL duration in the affected neural centers in the above disorders so as to initiate and promote motor recovery.

What is Synaptic Competitive-Learning (SCL)?

In the intact brain and spinal cord SCL is a naturally-endowed developmental event during motor/locomotor learning and maturation in the neuromuscular junctions,

spinal motoneurons, Renshaw neurons, cerebellar cortex Purkinje neurons, and cerebral motor cortex. SCL is not unique to the motor system alone. SCL is the natural developmental process in the visual cortex, lateral geniculate ganglion, and in the autonomic ganglia [10]. SCL consists of generation of an initial redundant numbers of synaptic connections, activity-dependent, competition-based, selection of connections, and redundancy pruning [5,12-15]. A striking example from human perinatal life is that, both sides motor cortexes project nearly equal numbers of corticospinal tract (CST) axons to each side of the spinal cord ventral horn neurons. Later, by around twelve years, by motor/locomotor learning activity-dependent, competition-based, selection-pruning process over 85 percent of axons from the contralateral motor cortex are selected and retained, while only around 15 percent CST axons retained from the ipsilateral motor cortex, and locomotor maturity reached [14,15]. Cognitive systems studies have come out with further interesting, complementary findings. In the intact adult brain-spinal cord centers too SCL is the principal form of sensory-motor skills learning and acquisition throughout adult life [5]. A principal difference, however, between the developmental SCL, and adult SCL is that in the former, there is actual growth of redundant synaptic connections and their competitive selection-elimination. Where as in the latter, there is no actual large scale growth, but redundant sets of connections are allocated from existing ones in the synaptic fields for competitive-interplay (SCL) and selection [5,7,16,17]. Both basic science and cognitive systems studies taken together convincingly show that in SCI, HCP, and stroke there is partial/complete cessation of all SCL mechanisms in the injured and denervated synaptic fields which cause spasticity, paresis/paralysis.

Sensory-Motor Paralysis: Clinical and Cognitive Systems Perspective

Clinical perspective

In these disorders, i) there is large scale degeneration/death of neurons at the injured site/s, ii) the target center/s these neurons project into (e.g. spinal cord ventral horn neurons, cerebellar cortex, thalamus) become denervated at varying degrees of severity. In the next several weeks, the remaining intact inputs to those target center/s spontaneously sprout-out and reinnervate the denervated synaptic sites [5]. In SCI paralytics there is extensive local sprouting and compensatory reinnervation at spinal cord, thalamus, cerebellar and cortical levels [18-20]. In cortical/sub-cortical stroke and in CP paralytics there is extensive local sprouting, and compensatory reinnervation of the denervated areas at ipsi-lesional, contra-lesional cerebral cortex. Following unilateral motor cortical

damage there is compensatory sprouting of ipsi-lesional side corticospinal tract in the spinal cord [21-26]. The usefulness or otherwise of such local compensatory connections in these paralytics towards motor recovery is a subject of ongoing debate. Clinicians are currently speculating how this compensatory plasticity could be exploited to promote motor relearning and recovery [23,26]. Depending on the severity and extent of injury the clinical picture presents as i) spasticity/overactivity/paresis/paralysis across limb muscles, ii) excitation-inhibition imbalance between synergists-antagonists [5,7,27], iii) the motoneuron's firing properties are in severe disarray, iv) orderly recruitment-derecruitment of motor units within and across muscles are severely impaired/lost, v) failure of adequate numbers of motor units activation presents as muscle weakness, vi) abnormal co-contractions of synergists-antagonists muscles [27]. Also see below, what current clinical investigations, cognitive systems, and brain-modeling studies have to say.

Cognitive systems perspective

In the intact brain sensory-motor centers' synaptic fields all learn-register-recall-execute functions and memory storage functions are controlled-regulated by two core fundamental brain properties, namely self-organizing, and stability-plasticity balancing [5,7]. In SCI, HCP, and stroke these two vital functions become severely disrupted/ ease altogether in the injured and denervated centers. Self-organizing is defined as the brain's inherent property to continually evolve in time and space that begin as simple networks in fetal life and progress into increasingly complex network systems that exhibit a hierarchy of emergent (e.g. motor) properties [16,17]. The learned-experiences (e.g. spontaneous movements in fetal life; hands-eyes-head coordination, reaching and grasping in the baby; crawling, sitting, standing, stepping, and walking in the infant; swimming, bicycling, playing piano in the adult) are stored at specific sites in the synaptic fields as memory weights in a self-organizing manner on the basis of previously learned, and closer to functionally associated weights [associative memory 16,17]. Stability-plasticity balancing is a fundamental brain property that controls and regulates all learn-register-recall-execute functions, and memory storage functions in the sensory-motor synaptic fields throughout life. While plasticity enables continual learning, stability ensures the storage of the learned experiences into memory weights [5,7]. In SCI, HCP, and stroke the spontaneously added compensatory, aberrant weights are not competition-based, nor activity-dependent. They distort partially/completely all memory traces and SCL mechanisms. New learning and recalls of previously learned skills into motor tasks execution are severely disrupted/lost altogether--known as stability-plasticity

dilemma [5,7]. In brief, cognitive systems studies point out that restoration of self-organizing and stability-plasticity balancing properties are essential pre-requisites for motor recovery to occur. This also sends a clear message to other therapies e.g. stem cells that they should, first address these issues.

Can SCL be Re-installed in the Injured Brain-spinal Cord Synaptic Fields?

When a motor nerve is sectioned and allowed to regenerate into its muscle, or the nerve is crushed (neurapraxia), or the muscle partially denervated, or BoTx injected into muscle [5,10,11] the motoneurons transiently display for some weeks, a number of SCL-restoring plasticity properties. In each of the above procedures, the motor axons sprout and hyper-innervate (polyneuronal) the denervated muscle fibers. The motoneuron soma size enlarges, dendrites hyper-expand; new dendro-dendritic electrotonic couplings become established between motoneurons. Transient neosynaptogenesis develops on the motoneuron soma-dendrites, and on pre-motoneuronal interneurons. This is followed by activity-dependent, competition-based (SCL) selection, and pruning of redundant connections at these two sites. The principal difference between the naturally-endowed developmental SCL and the induced SCL (by nerve section, neurapraxia, partial denervation, BoTx etc) in the adult is that the former lasts for several weeks/months. In the latter procedures, the induced SCL is rather localized and short-lived, lasts for few weeks. The pressing question is that how to prolong the SCL duration in the injured brain-cord as comparable to developmental SCL processes?

BoTx Peripheral and Central Mechanisms of Action in Spasticity Relief

The beneficial effect of BoTx in spasticity relief is generally attributed to its Ach release blocking action at the motor terminals, the altered afferent signals from the injected muscle on to its synergists-antagonists, and the sensory plasticity at spinal and supra-spinal levels [1-3]. It should be stated however, that the far-reaching actions of BoTx at the motor system have been overlooked for far too long [4-6]. BoTx causes extensive sprouting of intramuscular motor axons, resulting in transient hyper-innervation (polyneuronal) of the injected muscle [4,6,8-10]. The motor units in that muscle start sharing each other's territories and thus the average size of motor unit becomes larger. This retrogradely acts on the motoneuron's soma-dendritic membrane. The soma size transiently increases together with hyper-expansion of the dendrites, and neosynaptogenesis occurs on the motoneuron-interneurons [4-6] (Figure 1). In spinal motoneuron, its soma size is one of the most important determinants of its

firing properties. In the intact adult spinal motoneuron its soma size is directly proportional to its motor unit size. Excitability of the motoneuron is inversely related to its soma size. Large motoneurons are less readily excitable than smaller ones (Henneman's size principle of the motoneuron) [28,29]. To sum up, the motoneuron's firing properties are determined

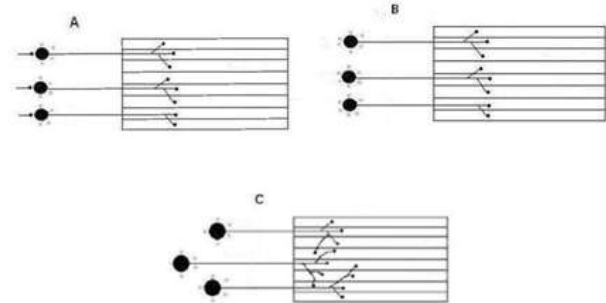


Figure 1: BoTx-induced SCL in the injured spinal cord:

A) Intact sensory-motor-neuromuscular system. The three large black spheres are alpha-motoneurons that innervate the muscle (rectangle with eight muscle fibers). Each muscle fiber receives a single motor axon terminal at its endplate (mononeuronal innervation). Grey dots are spindle and tendon organ afferents synapses. Black dots are synapses from descending motor tracts. Grey squares are spinal interneuronal synapses. These synapses on the motoneuron represent the learned motor experiences stored as motor memory weights

by- i) its soma size, ii) the precise locations of the learned weights (excitatory, inhibitory, and disinhibitory) on the dendrites, soma and axon hillock, iii) the relative distances between the weights. These three regulatory mechanisms finely balance each other during development and throughout adult life. In SCI, HCP, and stroke all the above three regulatory mechanisms are thrown into disarray and hence the normal firing pattern of the motoneuron is severely disrupted. Following BoTx injection into single, isolated spastic muscle/s the initial increase in motoneurons soma sizes and the resultant decrease in their excitability ameliorate the overactivity-spasticity [4,6]. The neosynaptogenesis at the spinal motoneurons-interneurons and the motor cortex repulses growth of aberrant synaptic weights. In the ensuing weeks, Ach release gradually resumes and muscle contractions begin. Competitive-selection-pruning of connections occurs at motor endplates and in spinal motoneuron circuits. The motoneurons soma sizes become reduced and resized and thus the synaptic weights become repositioned in a self-organizing process [4-7]. But then, all the above beneficial SCL peripheral and central plasticity lasts only for some weeks. Then spasticity returns to the muscle, warranting repeat BoTx injections. Thus we see that BoTx has two distinct, but closely inter-

related function facets. First is its acetylcholine release-blocking property that relieves spasticity by paralyzing that overactive muscle. However, as the effect of the toxin vanes off the spasticity returns [1-3]. The second is its SCL-restoring property at motor endplates, spinal motoneuron soma-dendrites, spinal interneurons, and cerebral sensory-motor cortex. This includes motoneuron soma size, formation of new dendro-dendritic coupling, new synapses formation, modification of excitation-inhibition balance, motoneuron firing frequency, reflex response, long-latency polysynaptic pathways, motor cortex maps reorganization [4-6]. Now the question is how to sustain this transient SCL effects to long periods? Basic science and clinical studies indicate that instead of injecting single, isolated muscle/s, if given in smaller doses to multiple, opposing muscles, in serial-repeats BoTx will reinstall-replay the SCL processes in several motoneuron pools as happens during infant motor-locomotor learning [4-6,11]. As until now, BoTx treatments have not taken these points into consideration.

Clinical Outcomes in BoTx Spasticity Therapy

The older clinical studies used BoTx in isolated muscle/s in a single session injection protocol with the sole objective of spasticity relief [1-3]. Thus the benefits were transient and spasticity returned later. But then, clinical neurologists had suspected that besides relieving spasticity, BoTx brought improvement in function. It was concluded then, that the existing study designs, injection protocols, the choice of outcome measures, and an incomplete understanding of the pathophysiology of motor paralysis were all the reasons for not detecting precisely the function improvement [30-33]. Later studies that used BoTx in repeat/serial sessions, and long-term for spasticity relief in SCI [6,34-38] in CP [39-43] and, in stroke [44-47] had reported improvement in function besides spasticity relief. Note that in all the above studies the dosing, the number of muscles, and spacing between injections were, in principle, designed for spasticity relief. Non-spastic, synergists-antagonists muscles were not treated. Even so, significant, and lasting improvements in function appeared. A number of clinical studies have vouched support on motor recovery brought by BoTx treatment. In CP in younger children each additional injection of BoTx had shown further gain in function improvement [40]. Studies further show that low-dose, and repeat injections are as effective [41-44] compared to high-dose single session procedures. In stroke, and brain injured spastics, serial injections of BoTx was found to be a useful strategy to avoid drug toxicity and resistance formation [38]. In stroke, SCI, CP, and traumatic brain injury (TBI), repeated treatment with BoTx showed sustained or enhanced improvement in efficacy/ and or duration over a follow-up period of up to ten years. In

stroke hemiparetics BoTx, besides reducing spasticity in the paretic arm, also significantly reduces associated reactions, thus reducing the adverse impact of associated reactions on daily activities [46]. In all the above studies, despite the rather limited objective, namely spasticity relief, the improvement in function reported is strongly suggestive of the SCL effects of this drug. This clearly shows that if SCL-restoring objectives were also included in the treatment procedure, then far significant improvements in function would emerge. It should be mentioned here that few, if any, of the above studies explained the neurobiology-plasticity mechanisms as to how the function improvement occurred in their patients.

The BoTx-SCL Treatment Protocol: Keep the Paralyzing Effect Minimized--prolong the SCL Duration

The primary objective of BoTx-SCL treatment protocol presented is to keep the paralyzing effects minimized while prolong its beneficial SCL effects. To achieve this, besides spastic muscles other paretic/ paralyzed muscles should be selected for low-dose BoTx treatment. Muscles should be selected after careful neurological examination and investigations (e.g. EMG). Spastic muscles should be given clinically effective doses of BoTx. Indeed they would need far smaller doses as several other muscles are being treated that have closely related motoneuron pools. If in the first session a prime mover muscle is injected, then in the subsequent sessions one of its synergists should be targeted for injection. Selected muscles should be given one third or less the dose as indicated for spasticity. The optimum low-dose for various limb muscles will have to be investigated by clinical trials. In the lower limb the segmental innervation of tensor fascia lata=L4, 5; biceps femoris=L5, S1, 2; gastrocnemius-soleus=S1, 2; extensor digitorum brevis= L4, 5, S1. These muscles are anatomically far distant from each other, but their motoneuron pools are close together, indeed segmentally overlap each other. Thus injecting BoTx into one muscle will trigger SCL effects in the other three motoneuron pools (Figure 2) [5,6,11]. Such pools overlapping exist also in upper-limb muscles. Thus only few key important synergists-antagonists will need injections in a given time frame. The optimum dosage and intervals between injections for best SCL effects will need be worked out on an individualized basis. The low-dose, multi- muscles concept is based on findings in clinical studies. A clinical trial pilot study showed that one half or one quarter standard dose of BoTx given to elbow, wrist, and finger flexors within three weeks of stroke onset not only averted spasticity formation in the paretic arm, but also brought improvement in arm function [48]. Injections should be timed in such a manner that while in a first set of muscles competition comes to

end there is beginning of competition in the second set of injected muscles. Hence while the paralyzing effects are confined to few muscles, the SCL duration is stretched to long periods, acting at several motoneuron pools. Injections may be repeated, if need be, as assessed by motor recovery outcome measures until satisfactory recovery is reached. How is the long-term safety and prolonged efficacy of this proposed treatment protocol envisaged? Available clinical evidence as of now suggests that repeated/serial BoTx administrations are safe; negligible or no adverse effects noted. Function improvements were sustained or enhanced for a follow-up period of few years and up to ten years [38,40,41,43,44].

BoTx-SCL Neurorehabilitation

As discussed earlier [4-7] BoTx recreates SCL environment in

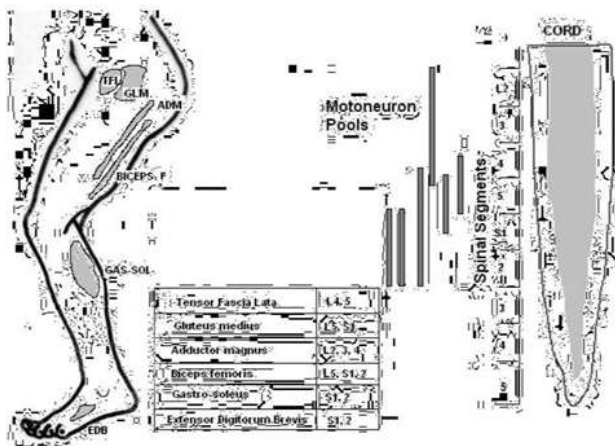


Figure 2: BoTx-induced SCL in the paretic/paralyzed lower limb Low-dose BoTx is injected into a few, selected muscles in serial/repeat sessions. Muscles selected are from among flexors and extensors of the hip, thigh, leg, and foot. Contracting muscles are not injected. In the next few weeks, intramuscular motor axonal sprouting, polyneuronal innervation control of the muscles fibers, and synapse competition (SCL) will take place. In the mean time, plastic increase in motoneuron soma size, neosynaptogenesis, and synapse competition (SCL) will eventuate in the spinal cord and motor cortical circuits. Note the close proximity, and segmental overlapping of motoneuron pools, though the respective muscles are anatomically far distant apart. Remote, un-injected muscles will also participate in the SCL processes and develop signs of recovery due to the pools' segmental proximity. Thus only few key important prime mover-synergist muscles would need be injected in a given time-frame [5,6,11].

the denervated brain-cord centers; and that lasts only for few weeks. Secondly, the synapses thus generated are rather functionally un-weighted, dummy synapses. The new connections should now be loaded with weights (remember, weights are learned-experiences) which have to be acquired by concurrent activity-dependent retraining programs [5,7]. What is activity-dependent relearning? Infant motor development studies [49], and humanoid robot motor-learning [50] reveal that sensory-motor skills are learned-acquired by initial random, exploratory, trial-and-error movements executed in a number of different (variability) ways on which more complex movement skills are learned and added upon [7]. They show that systems that employ competitive-learning (SCL) principles learn 44 percent faster than other learning systems [50]. Clinical studies have confirmed these observations. In stroke patients, on whom variable training schedules and random functional movements were practiced have shown superior retention of the learned practices that generalize into activities of daily living [51].

Computational modeling [52,53] and fMRI clinical study [54] of motor cortex hand map reveal that the maps are highly dynamic, malleable representations. Shifts in the map borders are resulted from continually ongoing competitive organizing process between neuron groups that control the map borders. Alterations in the hand map can be readily brought up by manipulations of the periphery, e.g. immobilization, amputation, BoTx treatment etc. For example, even a trivial procedure such as immobilizing two fingers together by a plaster-splint for a few weeks can blur the finger borders in the motor map which become reversed and borders become clearly defined once the splint is removed [54]. In hand muscles dystonia (Writer's cramp), the hand motor map is displaced from its normal site. BoTx injection into affected hand-forearm muscles brings relief of spasticity; restores the map to its original site. However, as the BoTx effect wears off, spasticity returns and the map is again displaced [55,56]. Why is the beneficial effect short-lived? This might be due to that only one or two affected hand, forearm muscles were injected in a single session and not repeated. Thus the SCL duration was inadequate for map's corrective processes to complete and establish. The inference is that in BoTx treatment, lasting functional gain can be achieved only by sustaining SCL processes to long periods for loading of weights to occur and establish [5,7]. Another example is from present-day rehabilitation programs for SCI paralytics. In these paralytics, even after intensive, long-term training (body-weight support treadmill) motor recovery appears long-delayed (five years), in small increments, and is rather marginal [57,58]. Why such long delay? As stated earlier the principal reason is that the affected neural circuits have

lost their self-organizing capabilities, are in a state of stability-plasticity dilemma and thus re)learning-resistant. It should be pointed out that as until now rehabilitation programs have not addressed these concerns. Most motor tasks e.g. arm reaching-grasping, are multi-joint, multi-muscles complex movement synergies. This means, hand motor map will receive from and project to shoulder, upper-arm, and forearm map regions. The human musculo-skeletal-motor system is endowed with redundant muscles, motor units, joints and degrees of movements [5,7]. Thus a specific movement can be performed in a number of different, variable ways. The maps complexity and the continually ongoing synapse competitive (SCL) processes will explain why multiple muscles, repeat BoTx injections, and relearning-time are needed for long lasting recovery to establish. In stroke and CP hemiplegics, the possibility of using the undamaged hemisphere, e.g. the ipsilaterally descending cortico-spinal tract (CST) axons, the bilateral hemispheric pre-motor centers, and bilaterally operating neuronal networks at brainstem and spinal cord levels etc have been proposed recently [22-26] for inducing compensatory recovery of motor function. In HCP children fMRI studies have shown that the normal competitive process between the crossed and uncrossed CST axons to gain connections with the spinal ventral horn neurons is severely perturbed [14,15,21]. In these paralytics the interruption-disruption of a fair competition and the occupation by aberrant, maladaptive weights has been recognized as factors that hinder motor recovery. This [14,15] is an important finding in the sense that it recognizes SCL as a fundamental neuronal process that controls and regulates motor development and maturation and that its disruption can affect normal motor maturation, and restoration. The present paper addresses these fundamental issues and the proposed BoTx-SCL treatment protocol is aimed to avert aberrant connections, reinstall SCL mechanisms and promote function restoration.

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Retrospective Analysis of Goal Assessment for Conservative Treatment and Surgical Intervention for Spasticity of Upper and Lower Limbs in an Interdisciplinary Neuro-Orthopedic Spasticity Clinic

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Abstract: -- **Background and Objective:** This retrospective study analyses the goal assessment of the treatment of spasticity. The outcome was to compare the efficiency of treatments in term of goal from the International Classification of Functioning, Disability and Health (ICF).

Methods: A database was created from the patients' medical files. The efficiency of treatment was then evaluated using the improvement in the sub-goals of the ICF: pain (B280-B289), function of the joints and bones (B710-B729), improvement of mobility (D450-DN83) and personal maintenance (D510-D599). The results are discussed after a literature review.

Results: The botulinum toxin injection was more common than orthopedic procedures. Orthopedic procedures showed a tendency to be more efficient regarding the improvement in ICF objectives.

Conclusions: This study was unable to prove a statistically significant difference between botulinum toxin and orthopedic procedure regarding ICF objectives due to the number of subjects being too small. But it showed that 83.4% of patients were treated by botulinum toxin before surgery and only operated in the case of failed goal-achievement. The surgery then enabled the goal to be achieved. This systematic goal assessment is necessary in order to understand better the efficiency of the management of spasticity treatment methods

Keywords — Spasticity; Management; Botulinum toxin; Orthopedic procedure.

I. INTRODUCTION

Spasticity refers to an abnormal, velocity-dependent increase in muscle tone resulting from interruption of the neural circuitry regulating the muscle and is a common complication of cerebral palsy, brain injuries, spinal cord injuries, multiple sclerosis and stroke [1]. Its incidence after a stroke is 17% to 38% [2,3]. Moreover, the severity of spasticity increases over time [4] and induces significant pain, contractures, joint subluxations or dislocations, peripheral neuropathy and pressure ulcers [5]. The prevention of complications due to spasticity is therefore important to improve the quality of life of patients. Among the different treatments of spasticity, botulinum toxin A is a well-tolerated and effective focal intervention for the reduction of spasticity, and it is widely recommended in

clinical practice [6]. Botulinum toxin is only reimbursed by Swiss health insurance for spasticity due to a stroke and the maximal recommended dose per session in Switzerland is 400 IU. In some cases, repeated administration of botulinum toxin leads to the development of resistance due to circulating antibodies [7]. If the botulinum toxin treatment hadn't a sufficient effect, it is possible to propose an orthopedic surgical approach to the patient.

Orthopedic procedures can be classified into three major categories: tenotomy, tendon transfer and tendon lengthening [8]. Tenotomies are reserved for the release of the tendon to severely spastic muscles [8]. Tendon lengthening is performed to weaken spastic muscles and position joints at a more natural and useful angle [8]. Tendon transfers are undertaken so that muscles, which remain at least partially functional, can produce useful movements [8]. Tendon lengthening and tendon transfer are

most successful in the lower extremity and tend to improve borderline ambulation [9].

The management of spasticity needs a multidisciplinary approach to define treatment goals according to the International Classification of Functioning, Disability and Health (ICF). The assessment of the patient occurs over multiple visits to determine the correct combination of therapies and procedures to achieve the best function [10].

To fulfil this requirement a spasticity outpatient clinic has been developed in the Clinique Romande de Réadaptation and in the department of Neurology at the Lausanne University Hospital (CHUV). Both centers use the same scales and scores to evaluate patients. A first consultation evaluates the indication for a botulinum toxin treatment. When conventional treatments such as physiotherapy, occupational therapy, antispastic drugs or orthosis are insufficient to obtain a satisfactory improvement there is a neuro-orthopedic consultation. A surgical approach is discussed in the presence of an orthopedic surgeon and a specialist in reconstructive and plastic surgery.

Patients

Inclusion criteria were to be older than 18, to suffer from spasticity and to have been evaluated in the interdisciplinary neuro-orthopedic spasticity clinic between December 2003 and November 2013. The spasticity should be severe enough to have an impact on the life of the patient. The only exclusion criterion was to have insufficient information in the medical records to complete the database.

Method

As the number of patients was too small to be statistically significant it was decided to carry out an observational study of a group of patients and the treatment they received for individual goal assessment. The goal assessments were taken from the main component of the International Classification of Functioning, Disability and Health (ICF). The database was created using data from patients' medical files of the CHUV in Lausanne, the Neurological Centre Plein Soleil in Lausanne and the Reeducation Centre in Sion. The primary outcome was to compare the efficiency of treatments in terms of ICF goals. For the chapter Body Function and Structure the chosen sub-goals for this study were improvement in function of the joints and bones (B710-B729) and decrease of pain (B280-B289). The mobility of joints was measured and compared before and after treatment. If the improvement was judged sufficient for the patient, the efficiency of treatment was considered as good efficiency. Because patients were followed for many years, it happened that a treatment with a good efficiency when the patient was first treated did not work well after a certain period. So to distinguish these from treatments

which maintained good efficiency, they were noted as partially efficient. The objective concerning pain was evaluated by the patient as good if the pain was relieved, partial if the treatment had no effect and bad if the treatment made the pain worse. The second ICF goal assessment corresponds to two sub-goals from activity and participation: mobility and self-care. Mobility is affected by spasticity in the lower limb(s) and self-care mostly concerns hand spasticity. So it was interesting to compare both. The improvement of mobility is important for patients with lower limb spasticity because it limits mobility and reduces quality of life [11]. Just as lower limb spasticity affects quality of life, upper limb spasticity can have a significant effect on self-care, like Toileting (D530) or Washing oneself (D510) [12]. Efficiency in terms of self-care and mobility were measured in the same way as the pain sub-goal: good for an improvement, partial if no improvement and bad if the situation got worse. The secondary outcome was to compare the previous results with results from other articles.

Results

In total, 102 patients attended the interdisciplinary clinic from 2003 but 61 did not have sufficient information in their medical records. 47.6% of patients suffered from spasticity post-stroke. Of 41 patients retained for the study, 78% had botulinum toxin treatment and 44% had surgical treatment (Figure 1). None of our patients suffered from a severe complication of these treatments. Only a few patients had surgical treatment without first receiving botulinum toxin (7.3%). Regarding the indication for treatment, we were able to group patients according to four ICF goals: lowering pain (B280-B289), increasing function of the joints and bones (B710-B729), increasing walking performance (D450-N83) and improving personal maintenance (D510-D599) (Figure 2).

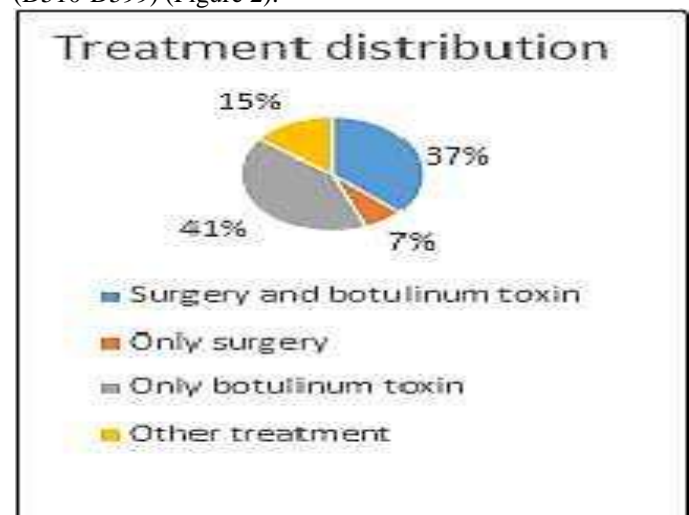


Figure 1: Treatment distribution

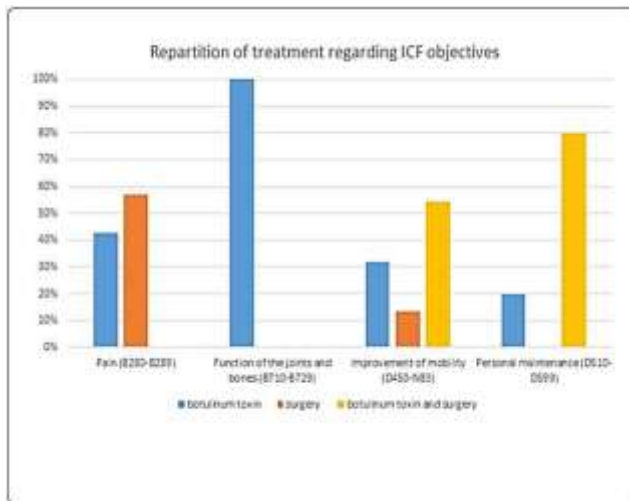


Figure 2: Repartition of treatment regarding ICF objectives

The efficiency of decreasing pain was good except for 14% who had partial efficiency. The efficiency of increasing function of the joints and bones was 45% good efficiency, 45% partially efficient and 10% bad efficiency (Figure 3). Botulinum toxin injections accounted for 84% of the treatments improving function. In the improvement of walking, 31% of the patients had only botulinum toxin injection, 13% only surgery and 54% had toxin botulinum injections followed by surgery. For surgery the major indication for treatment was spastic equinovarus foot: the efficiency was good for 73% of the patients and partial for 27%. Botox had a good efficiency in 31%, partial efficiency in 57%, and bad efficiency in 10% (Figure 3). Regarding an improvement in personal maintenance, 44% of patients had surgical treatment. The surgery efficiency was good in 50% and partial in 50%. For the botox, there was 20% of good improvement, 60% partial and 20% bad (Figure 3).

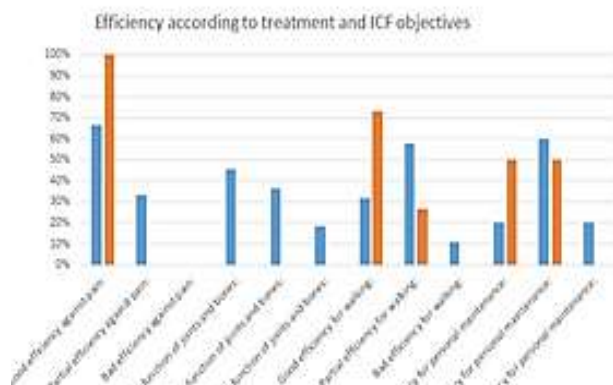


Figure 3: Efficiency according to treatment and ICF objectives

II. DISCUSSION

The botulinum toxin injection treatment was the procedure patients in this study had the most. It can be explained by the fact that botulinum toxin is a safe and reversible procedure. Indeed, effects will last a few months and if the treatment is not satisfying, another procedure can still be tried. In our study, the high number of patients treated with botulinum toxin can also be explained by the type of study. Indeed, as a retrospective observational study, no randomization had been done and the all our patients first went to a spasticity clinic to evaluate the indication of a botulinum toxin injection. In the literature, many articles can be found to prove the efficiency and safety of botulinum toxin. For example, a retrospective analysis from Baricich A et al. [13] evaluated the efficacy and safety of high doses of botulinum toxin in 26 patients affected by upper and/or lower limb post-stroke spasticity. No adverse events were reported and high doses of botulinum toxin were shown to be effective and safe.

The results of the study show that a minority of patients had surgical treatment but with a better improvement in ICF objectives (Figure 4). There is a selection bias, because as surgery does not allow an easy way back, the surgeon will recommend surgery only for patients who he is sure will benefit from it. But, even so, we found a study from Van Heest et al. [14] which ompared botulinum toxin injection treatment, surgical treatment and ongoing treatment for children with upper- extremity cerebral palsy. They demonstrated that surgical treatment provides a greater improvement, of modest magnitude, Than botulinum toxin injections or regular, ongoing therapy at twelve months

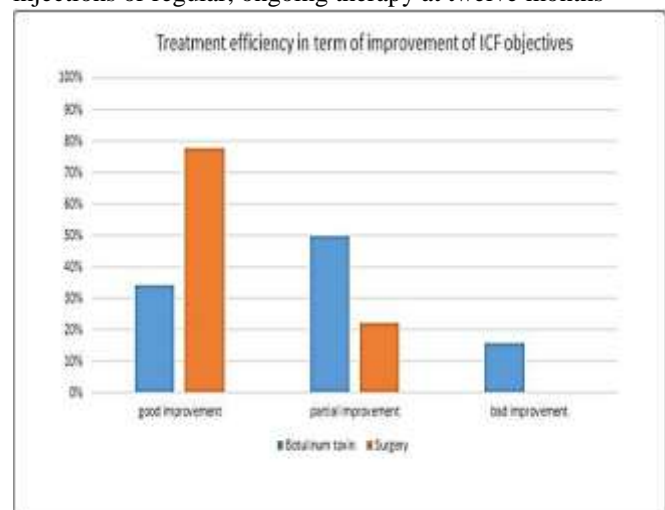


Figure 4: Treatment efficiency in terms of improvement of ICF objectives

Regarding the patients' activity, an improvement in walking was demonstrated by a lot of patients with varus equinus

spastic foot deformity who had surgical treatment. A retrospective study from Vogt et al. [15] confirms that surgery for equinovarus foot can increase the walking distance. Of 82 patients who were examined up to 65 months after surgery, 74 reported an increase in their walking distance even if moderate. But we also found a study which confirms the efficiency of botulinum toxin injection for equinus foot [16]. So a good multidisciplinary evaluation should be carried out to find the better management depending on the situation. To compare improvement in mobility which is affected by lower limb spasticity and improvement in personal maintenance which is affected by upper limb spasticity, treatments provided better improvement in walking than in personal maintenance [17]. Maybe the management of lower limb spasticity is better than upper limb spasticity, but with such a small number of patients, the difference is probably not significant. This would be an interesting subject to study in a future research project.

III. CONCLUSION

This retrospective observational study shows that a minority of patients had surgical treatment but with better improvement in ICF objectives. But as it is a safer procedure, with 60% of partial success we recommend always trying the botox treatment before surgery. Further studies with goal assessment are needed with a larger population and prospective goal assessment based on ICF evaluation should be completed considering the individual needs of the patient, taking account of the heterogeneous context.

Declaration of interest

There were no financial or personal relationships with other people or organizations that could inappropriately influence this article.

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SozioTex-Sociotechnical systems in the Textile Industry: Interdisciplinary Competence Build-up in Human-machine Interaction Facing Demographic Change

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Abstract: -- High-wage countries are on the brink of change, due to social and technological effects. In this paper, we will first give an outlook on both these effects concerning the German textile industry. Second, we will shortly describe the interdisciplinary build-up of our research group which influences the way how we address our research issues. Finally, we will outline two prototypical applications that serve as demonstrators for further user tests and subsequent developments.

Keywords — Industrie 4.0; Workforce diversity; Human-machine interaction; Augmented reality.

I. INTRODUCTION

The textile industry is the second largest consumer goods sector in Germany, with a focus on technical textiles. Industrial textile machines are used in the manufacture of various products e.g., clothing, lightweight construction, car interiors, or the field of medical technology. Germany's textile industry - as a prominent example for western high-wage industries - is on the brink of change, due to both inherently social and technological effects. In this paper, we will firstly give an outlook on both these effects (cf. 2+3). Second, we will shortly describe the interdisciplinary build-up of our research group which influences the way how we address our research issues (cf. 4). Finally, we will outline two prototypical Augmented reality (AR)-based applications (apps) that serve as early demonstrators for further user tests and subsequent developments (cf. 5).

Social Change: Increasing Workforce Diversity

Concerning social reasons, a central aspect has to be seen in demographic changes: The current German workforce is increasingly aging, with a strong increase of employees aged 50 years and older. E.g., according to statistics of the German Federal Employment Agency from 2013, the number of employees older than 60 years increased from 2011 to 2012 by 12.5%. When compared to 2007, this share of personnel aged 60+ years even increased by 76.9% to a

total of 1.654.831 people [1]. Overall, further increase of this age group is prospected. Rather more, the currently high influx of migrants to Germany will soon lead to a more diverse workforce in terms of sociocultural and educational backgrounds. Hence, these demographic changes will have a massive impact in the German textile industry, too.

Technological Change: Human-Machine Interaction At the same time, new production technologies based on Cyber-Physical Production Systems (CPPS) and the Internet of Things (IoT) are pushing their way onto the textile industry's shopfloor [2-4], forming the basis for what has been labeled the Fourth Industrial Revolution ('Industry 4.0') by German government and enterprises alike [5]. Due to interaction with smart production machines together with progressive automation, overall industrial processes, work structures, and tasks of employees are changing on all organizational levels. Work tasks and job profiles are becoming more complex.

This holds true for the textile industry as well: Individual processes in the textile industry like weaving or finishing are highly automated-- especially in the field of technical textiles. Therefore, the handling of modern textile machines is more complex than before and requires increasing skills of the employees in operation and maintenance. For instance, the requirements of mechanics become more mechatronics-oriented and industrial electricians work more and more together with computer scientists.

As a consequence, more and entirely new skills will be needed for efficient and effective human-machine interaction in the near future ('HMI 4.0'). It can be assumed that classic technicians will primarily have to do creative 'trouble shooting' in the future and will therefore take on traits of knowledge workers [6, 7].

The combination of both effects, i.e., increasing diversity of the workforce in the textile industry and increasing complexity of smart machines, creates the necessity of human-centered assistance systems that help the individual employee to improve his or her skills and to pass on knowledge to co-workers and colleagues

SozioTex Research Group

Competence build-up in human-machine interaction for the textile industry There has been very limited research on the combined social and technological effects on the workplace in the textile industry. Therefore, the interdisciplinary SozioTex team comprising engineers, sociologists, and educational scientists takes on the task of analyzing and evaluating the effects of increasing diversity as well as the increasing usage of highly complex Industrie 4.0-technology in the textile industry (Figure 1). Additionally, the SozioTex team designs, tests, and evaluates assistance systems that help cope with the aforementioned effects and minimize the discrepancies between young digital natives and older employees: The former adopt easily to new technologies but often lack professional experience, whereas the latter ones have more hands-on experience but have difficulties when facing working with new digital systems.

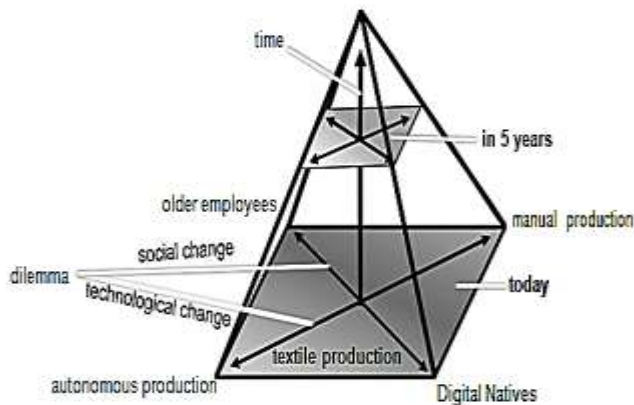


Figure 1: Vision of adjustment of social and technological change [8].

Prototypical Applications

Augmented reality-based human-machine interaction assistance

So far, the SozioTex team has designed two assistance systems [8,9]: The first one is based on the assumption that a suitable HMI 4.0 system forms a key element to integrate

the flexibility of humans and their ability to handle complex tasks in a textile production unit. Therefore, an HMI 4.0 prototype is developed which serves to support human operators in a (momentarily lab-scale) production unit. The central component consists of smart glasses which serve as the user interface. This see-through wearable device augments the shopfloor reality with assistive information. Besides consuming information, shopfloor personnel is also enabled to give feedback to the production unit. Thus, a bidirectional communication channel between the human operator and the Smart Textile Factory is created [9-11]. The second assistance system is a mobile application for smartphones, tablets or smart glasses that makes use of augmented reality (AR) to assist the operator of a weaving machine. The AR application assists in the handling of weft yarn breakages by detecting where the breakage occurred and interactively showing how new yarn has to be inserted [9, 11]. Furthermore, an important part of the SozioTex research draws on an algorithm that enables a method for multi-objective self-optimization of the weaving process: This system is capable of calculating the optimal parameter settings with regard to user-defined preferences of objective functions. The self-optimization algorithm helps operators to set up a weaving machine with significantly reduced trial and error runs and changeover costs [12,13]

Conclusion and Outlook

To conclude, the adoption of such Industry 4.0 solutions in the textile industry and its effects on employees are assessed in cooperation with partners in industry and research and along with key user tests of demonstrator models. Furthermore, the compatibility of enterprises to processes is tested and recommended actions are deduced from best practice examples. Therefore, to sum up: the implementation of Industry 4.0-related technologies and systems will only prove successful if the employees are included in the process from the very beginning, as they have to be recognized as the ones who will integrate and use the systems.

II. ACKNOWLEDGMENT

We thank our colleagues for fruitful discussions and valuable feedback. Additionally, we would like to thank our student research assistants for their support, and especially our master's students Bram Vanden Bergen and Gregory Longé for the first prototypical app implementations. Moreover, we thank the German Federal Ministry for Education and Research for funding the SozioTex project within the programme 'Interdisciplinary Competence Development with Research Focus on Human-Machine Interaction for the Demographic Change'.

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Achieving Compliance and Minimizing Enforcement Actions in the European Banking Sector in the Post-Crisis Period

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Abstract: -- This paper focuses on the issue of post-crisis banking regulations in the European Union and matters related to ensuring compliance with them and minimizing enforcement actions related to them. The aim of this paper is to determine the significance of the compliance function in the banks and to consider to nature of enforcement actions in the post-crisis years. Based on the analysis, the hypothesis was formulated that the importance of the regulatory compliance increases with the intensification of the enforcement actions of banking supervision authorities. The article attempts to describe the unexplored dependencies between the increase in regulatory requirements for banks in the post-crisis years and the dynamics of enforcement actions.

Keywords — Bank, compliance, enforcement actions, post-crisis regulations.

I. INTRODUCTION

One of the main reasons for global financial instability in 2007-2010 was the significant gap between the level of pre-crisis regulation and supervision related to the banking sector and the level of its development (and the risk taken by banks). In reference to the above, there was a need for a new modeling of regulatory solutions adapted to the current level of cross-border development of the around-the-world, around-the-clock banking sector. For this purpose, a large number of post-crisis banking regulations aimed at restoring the stability of the banking sector in the European Union.

The majority of banking regulations currently in force in the European banking sector were introduced during the post-crisis period, what caused the significant increase in regulatory requirements. Post-crisis regulatory change in the European Union mainly consisted in new rules introduction, existing rules amendment and institutions establishment or reformation [5]. It is important to note, that the level of detail and complexity of post-crisis banking regulations has increased, that mean for banks more challenges for European banks.

II. FINDINGS

After the financial crisis, the main challenge for European banks became the need to adapt their structures and methods of operation to a much larger number of new regulatory requirements. For this reason, the compliance function has

begun to gain importance in order to secure compliance of the bank's activities with the applicable law, internal regulations and standards of conduct adopted by the bank. As a result, the compliance function assumed a fundamental role in supervising the correct implementation of post-crisis regulations in the banking sectors of global economies, including European Union. The definition of compliance function in banks was provided by Basel Committee on Banking Supervision in

Consultative Document "The compliance function in banks" in 2003. According to which, compliance function can be defined as: an independent function that identifies, assesses, advises on, monitors and reports on the bank's compliance risk. That is, the risk of legal or regulatory sanctions, financial loss, or loss to reputation a bank may suffer as a result of its failure to comply with all applicable laws, regulations, codes of conduct and standards of good practice [9]. In April 2005, the Basel Committee on Banking Supervision recommended to create a special compliance unit dealing with the compliance risk, to ensure safety and soundness banks and the stability of the financial system [2]. The compliance unit should operate based on the main principles implemented by the Basel Committee on Banking Supervision, namely regarding independence of compliance function, resources, obligations and relations of the compliance unit with internal audit unit. The overview and description of the main compliance function principles, adopted by the Basel Committee on Banking Supervision, are presented in Table I.

III. THE ROLE OF THE COMPLIANCE FUNCTION IN THE BANKS

Important to note that although the obligation to create compliance units at banks was introduced by regulators, however, issues related to their location in the bank's structure and scope of duties depend on individual decisions of each bank. For this reason, in practice the compliance function operates on similar principles in banks, nonetheless, diversify in terms of scope of duties and placement within the bank's structure.

In reference to the above, due to the placement of the compliance unit in the bank structure, compliance organizations in banks can be divided into three types [1]. Exhibit I lays out the following compliance models in banks: 1) separated – stand-alone model; 2) combined model – legal-led organization; 3) combined model – risk-led organization. In the separated model, – stand-alone model – compliance unit reports directly to the bank's senior management and is fully independent from other departments. In turn, in the combined models, the compliance unit is an integral part of another department, e.g. legal or risk department.

Table I. Overview of compliance function principles, implemented by the Basel Committee on Banking Supervision.

Compliance function principles
<p>1. Independence. The bank's compliance function should be independent.</p> <ul style="list-style-type: none"> First, the compliance function should have a formal status within the bank. Second, there should be a group compliance officer or head of compliance with overall responsibility for coordinating the management of the bank's compliance risk. Third, compliance function staff, and in particular, the head of compliance, should not be placed in a position where there is a possible conflict of interest between their compliance responsibilities and any other responsibilities they may have. <p>Fourth, compliance function staff should have access to the information and personnel necessary to carry out their responsibilities.</p>
<p>2. Resources. The bank's compliance function should have the resources to carry out its responsibilities effectively.</p> <p>The resources for the compliance function should be both sufficient and appropriate to ensure that compliance risk within the bank is managed effectively. The professional skills of compliance function staff, especially with respect to keeping up-to-date with developments in compliance laws,</p>

rules and standards, should be maintained through regular and systematic education and training.

3. Compliance function responsibilities.

The responsibilities of the bank's compliance function should be to assist senior management in managing effectively the compliance risks faced by the bank. Its specific responsibilities are set out below. If staff in different departments carry, some of these responsibilities out, the allocation of responsibilities to each department should be clear.

Important note: not all compliance responsibilities are necessarily carried out by a "compliance department" or "compliance unit".

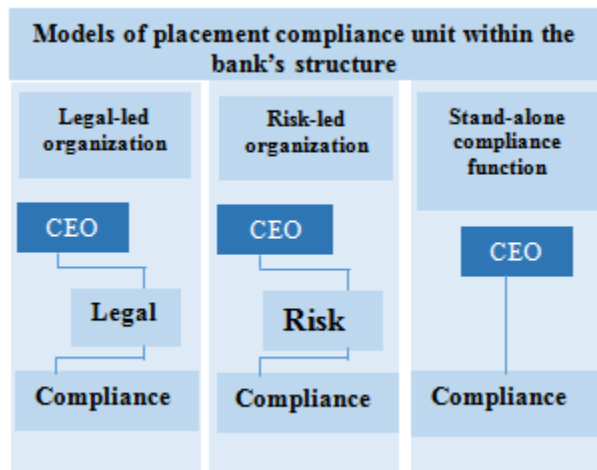
4. Relationship with Internal Audit.

The scope and breadth of the activities of the compliance function should be subject to periodic review by the internal audit function. Compliance risk should be included in the risk assessment methodology of the internal audit function, and an audit program that covers the adequacy and effectiveness of the bank's compliance function should be established, including testing of controls commensurate with the perceived level of risk.

Source: own elaboration based on The compliance function in banks, The Basel Committee on Banking Supervision, October 2003, s. 3-8.; Compliance and the compliance function in banks, The Basel Committee on Banking Supervision, April 2005, s. 9-16.

Nowadays, the separated model acquires popularity, that is, the separation of the compliance unit on the procedural, organizational, technical and physical grounds [4]. In banks where the compliance unit is an integral part of another department, a recent trend consists in migration of compliance unit from legal department to risk department. This new trend reinforces the view of compliance function as a risk similar to operational risk and as a control rather than advisory function. Which means that in situations where the compliance unit forms part of another department, it becomes important the following: proper division of competences, communication, consulting, support and effective exchange of information between departments. Additionally, constriction of compliance function, on the one hand, depends on the profile, the scale of the banks' operations, their size, and on the other hand – on the legal and cultural environment, short and long-term state policy and the decisions of national regulators who care about the stability of financial systems.

Exhibit I. Models of placement compliance unit within the bank's structure.



Source: own elaboration based on: A best-practice model for bank compliance, McKinsey&Complany, January 2016, <https://www.mckinsey.com/business-functions/risk/our-insights/a-best-practice-model-for-bank-compliance>.

It is also important to note, that the compliance unit operates in two ways, namely both within the organization at the level of internal procedures and standards, as well as outside according to the applicable legal provisions and regulatory requirements. This means that from inside perspective the compliance function is fundamental to ensuring bank's safety and soundness [3], and from outside perspective, to ensuring compliance with regulatory requirements by collecting, monitoring and analyzing regulatory data and tracking developments in a rapidly changing European environment in regulatory sphere. The all above-mentioned confirms that, as the complexity of the regulatory activity has risen markedly, the compliance function is essential and significant for the effective operation of banks in the rapid evolution of the banking regulations and contemporary conditions.

Compliance unit, apart from ensuring compliance of banking activity with legal provisions, also performs many other functions as control, supervisory and coordination, supporting activities of another bank's units (e.g. audit, legal, operational risk department etc.). Thanks to the controls and supervision exercised by the compliance function, it becomes possible to take instant corrective actions before the incident occurs or just after its occurrence. The compliance unit also has a preventive function, which is very important in managing reputation risk and in contacts with supervisory institutions.

IV. ENFORCEMENT ACTIONS IN EU

Currently, from compliance units in the bank are also expected to have high control capabilities, thanks to which

banks will more effectively avoid financial penalties and fines for non-compliance or violation of applicable regulatory requirements. In other words, it is expected that the effective operation of the compliance function will affect the minimization of fines and financial sanctions against banks by supervisors as part of their enforcement actions. Enforcement actions are a key tool for banks' supervisors in order to make banks comply with the prudential requirements set out in banking regulations, standards and sets of recommendations. Enforcement actions are used in case of violation of law and the use of unwanted practices by banking institutions or individuals.

The main entity applying enforcement actions within the European Union is the European Central Bank (ECB), which, under Single Supervisory Mechanism (SSM) [6], entrusted with specific supervisory tasks concerning the prudential supervision of credit institutions. Important to note, that few tasks, such as consumer protection, the fight against money laundering and terrorist financing transferred to the national authorities.

The ECB exercises the supervisory tasks by imposing pecuniary penalties, or fines, the maximum amount of which can be equate to twice the amount of the profits gained or losses avoided as a result of the breach, or 10% of the bank's total annual turnover [8]. Because the number of applicable regulations is increasing, the intensiveness and the number of enforcement actions against the European banks are increased due to non-compliance. According to statistics of European Central Bank, by 31 December 2017 the ECB had imposed five penalties amounting to 15.3 million EUR [3]. The ECB also submitted 12 requests to national competent authorities to open proceedings, which so far have led to total penalties of 5.1 million EUR [7]. The main areas on which the ECB focuses in enforcement actions are following, namely capital and liquidity requirements, large exposures, reporting obligations and governance in banks.

In the post-crisis years in the European Union, as well as in the United States, there is a trend of rising costs of non-compliance and law breaking in the banking sector, which are expressed in penalties and financial sanctions of the supervisory authorities. With reference to the above, important attention is made on the effective operation of the compliance function in banks, which can identify non-compliance in advance and prevent or minimize the application by the supervisor of enforcement actions.

V. CONCLUSION

Currently, from compliance units in the bank are also expected to have high control capabilities, thanks to which banks will more effectively avoid financial penalties and fines for non-compliance or violation of applicable regulatory requirements. In other words, it is expected that

the effective operation of the compliance function will affect the minimization of fines and financial sanctions against banks by supervisors as part of their enforcement actions.

As a result, the compliance function assumed a fundamental role in supervising the correct implementation of post-crisis regulations in the banking sectors of global economies, including European Union. This is the confirmation of the formulated hypothesis that the importance of the regulatory compliance increases with the intensification of the enforcement actions of banking supervision authorities.

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Deepening Democracy in India: From Ancient Period to Modern Period of Dr. B.R. Ambedkar's Views

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Abstract: -- The proposed paper explores the intimate historical and modern connection between Deepening Democracy in India from Ancient period to Modern period; Democracy is a Greek Word which means peoples power. The word comes from demos "Common People" and Kratos, "Strength". Democratic form of Government is the best form ever. It improves the lives of every individual in the system. It treats every individual equal before law. Evidence of a Democratic system of Government in India is originally found in the Vedas. There is a distinctive evidence from Rig-Veda, which mentions thriving republican form of Government in India. We may quote a few beautiful slokas from Rig-Veda. The Rig-Veda is so committed to democratic principles and ideals that has made democracy a deity and aptly called it "Samjnana". The term Samjnana means the collective consciousness of the people, the National mind to which the individual mind is to pay its homage as the source from which it derives its potency. The hymn addressed to samjnana (in Rigveda) called upon the people together in their assembly (Samgachaddhram) and speak there is one voice (Samvadaddhvam) in a Union of minds (Sammanah), or hearts (Samachittam), of policy (Samanmantrah) and of hopes and aspirations (akuti). Democracy in modern India. The British rule also was against democracy. It was the Government of India Act 1935 that laid the foundation stone of democratic rule in India. The efforts for giving political freedom to India started from 1946 till it became free in August, 1947. Dr. BR. Ambedkar was architect of Indian Constitution. He was also called father of Indian Constitution. He believed that Democracy essential in imparting social (4) justice, political democracy cannot succeed without social and economic democracy is to achieve political democracy.

Keywords — Common People, Principles, Social Justice, Republican, Union of Minds, Economic Democracy.

I. INTRODUCTION

HISTORY

LEGISLATIVE: In India still Legislative should come with laws which will give truths to all particularly the poor, marginalized people laws must empower. People too early out democratic reforms.

EXECUTIVE: Every public servant should work hard to serve people rather than serving themselves.

JUDICIARY: Every Lawyer or Magistrate should favour 'JUSTICE' rather than following favors. It is said that "justice delayed is rustle denied" by keeping their quote in mind every Court should try to resolve early faster.

MEDIA: Print, digital media etc., play a key role in democracy, they can demand transparency and accountants behalf of people.

The word 'democracy' originates from two Greek words demos (people) and Kratia (rule). In a literal sense, it means 'rule of the people'. So the great Athenian leader (Pericles) defined it as 'a government in which people are 'powerful'. According to Abraham Lincoln, it is the government of the

people, by the people, and for the people. In the words of Sir John Seeley, "it is a government in which everyone has a share". To Dicey, "it is a form of government in which the governing body is comparatively a large fraction of the entire nation. Lord James Bruce affirms, since the times of Herodotus, the word 'democracy' has been used to denote that form of Government in which the ruling power of a state is largely vested not in any particular class or classes but in the members of the community as a whole.

Historically, democratic system a governance in India was started from Vedic period. Since ancient times, democratic system has been strong in India? Its evidence is derived from an ancient literature, coins and various records. It would not be wrong to say that the principle of democracy is originated from the Vedas. The Sabha and Smiti are mentioned in both Rig Veda and Atharva Veda. In these meetings decision were made after the discussion with the King, Ministers and Scholars. Therefore, it is come to be known that how politics was at that time, because people together used to settle the decisions of the Sabha and Samiti with good vision. Even people of different ideologies were divided into various groups and take a decision were divided

into various groups and take a decision after mutual consultation. Occasionally there was also a conflict between ideas due to the differences in the mindsets of people. So it will not be wrong to say that the beginning of a bicameral legislation can be considered since the Vedic period. Even the selection of Indra was also due to these committees during the vedic period. At that time, Indra was the post which was known as kings of kind. The word republic has been used forty times in Rig Veda, 9 times in Atharva Veda and in Brahman texts many times. After the decline of the vedic era, the monarchs emerged and remained the ruler for a long time.

Some Slokas from Rig Veda were to be sung in unison at the beginning of the republic assembly. They were : Sam Sam id Yuvase Ur Sann Agne Vishv Any arya Alias pada sam idhyase sa no vas Uny A Bhara Sam gachadhvam Sam Vadhavamm Sam Vo Man Amsi jAnatAmdeva bhagam yathm purve Samjan Ana up Asate Sam Ano mantram abhi Mantraye vah sam Anena Vo havi sa juhomi Sam An Iva Akutih Sam Ana Rvday Ani Vah Sam Anam astu vo mano yatho Vah Sasah Astaill the term Sabha (gathering) Samiti (Smaller Gathering or Committee) Rajan or Raja (House holder, Leader) exists and are found in vedic literature. Rig Veda also says that the position of the King (Leader) was not absolute, and he could be removed by the Sabha or the Assembly. Rig Veda had made democratic principles and its ideals a deity and called it as 'Samjnana'. This term means the collective consciousness of the people. The hymns of Rig Veda addressed to Samjnana called upon the people to gather in their assembly i.e., Samgachchaddhvam and speak there in one voice i.e., Samvadaddhvam, in a union of minds (Sammanah), of hearts (Samachittam) of Policy (Samanmantrah), and of hopes of aspirations (Akuti).

Some important facts of modern Parliamentary democracy like decision by the majority were also prevalent at the time? After Vedic period, the description of small Republics is found in which people participate together in the decision making process related to the administration. The Republic was defined as a democratic system in the ancient India. In the Atreya Brahmins, Ashtadhyayi of Panini, Inscriptions of Mahabharata, Ashoka Pillars the historical writings of contemporary historians, Buddhist and Jain Scholars, in Manusmriti, various historical evidences are found.

WHAT IS DEMOCRACY?:

India is the largest democracy in the world. It was declared secular and democratic its constitution came into force on 26th January 1950. The democratic India believes in the principles of equality, liberty, justice and fraternity. The people from any caste, creed, sex, religion and religion have

an equal right to vote and choose their representatives. The Parliamentary form of government in India is based on the pattern of the British. In India there is a federal form of government which means there is a government at the centre at the state. The government at the centre is responsible to the Parliament, and the state government are responsible towards their respective legislative assemblies. The government at the centre and the state are democratically elected at the centre and the state and democratically elected and allow the patterns of the two houses of the Parliament Lok-Sabha and Rajya Sabha. The government at the Centre and State together elect the President of the Country who is also the Head of the State.

Elections play a vital role in democratic system of governance. In India for most thing is every citizens who are above 18 years should Vote. In India the political propaganda is related with elections. The election process in India is considered to be the inheritance or the main thing of the political corruption. The present elections are not in a way of correct manner as it requires an enormous amount of money and muscle power to win the elections in India. The persons who are contesting in elections usually spent enormous amount of money to attract the votes of people by giving money for vote or spending lavishly to get the votes in elections. Voting system in India has gone through multiple changes. During the first general elections in Lok Sabha in the year 1952 and 1957, each candidate was allotted a separate ballot box with the symbol of the candidate and the names and symbols of the candidates were no printed on the ballot paper and voters had to drop an pre-printed ballot paper in the ballot box of the candidate of their choice. The system created the thinking and fears of tampering, both capturing and handling in the minds of the various stake holders and was soon replaced. In 1977, the ECI, requested the electronic corporation of India to study the possibility of using an electronic device for conducting elections and the government of designing and developing an electronic gadget for conducting elections.

WHY IS DEMOCRACY?:

In 1979, a prototype was developed and its operation was demonstrated by the ECI before representatives of political parties on the 6th August, 1980. In 1982, the Election Commission of India issued directive under the Article of 324 of the Constitution of India for the use of Electronic Voting Machines (EVMs) and conducted elections at 50 Poling Stations using the machines in a bye elections in Parur Assembly Constituency (AC) of Kerala in the way of an experimental basis. Due to the absence of any specific law prescribing the use of EVMs, the election was challenged in a petition and on 5th March 1984, the Hon'ble

Supreme Court of India held that EVM cannot be used in an election unless a specific provision is made in law for its use. After this a law was amended by the Parliament in December 1988 and a new Section 61A was included in the Representation of the People Act 1951, thereby empowering the ECI to use EVM and the amendment came into force on the 15th March, 1989. The further of democracy and the system of parties in a country depends upon the perception of the society to change according to the demands of the democracy. Illiteracy among the backward groups, citizens affected by poverty, lack of awareness among the rural people are some of the reasons why there is prevalence of casteism in elections. The Election Commission has conducted a number of ideal electoral reforms to strengthen the democracy enhance the efficient functioning of elections. The election machinery, under the protection and support of the E.C., deserves credit for the conducting elections in a free and fair manner. But our system is still affected by many problems. To win votes political parties resort to foul methods and corrupt practices. These encourage the anti-social elements to enter the electoral fray. The problem is not insufficient of laws, but lack of their strict implementation. In order to stamp out these unfair tendencies. There is a need to strengthen the hands of the EC and to give more legal and institutional powers. The EC must be given with the powers to punish powers. The EC must be given with the powers to punish the corrupted politicians who violate electoral laws.

WHY DOES INDIA'S NEED THE DEEPENING DEMOCRACY?:

India is a very large country of diversities on the basis of language, culture, and religion. At the time of independence, it was economically underdeveloped. There were enormous regional disparities, wider spread poverty, illiteracy, unemployment and shortage of almost all public welfare means. Since independence, Indian democracy has been in perpetual conflict with the quasi-feudal structure of society. Caste based hierarchies are undemocratic, unscientific and unethical, ruining relentlessly at the foundation of our democracy. Unfortunately, rather than advancing the cause of fraternity, our political parties have by and large succumbed to the use of caste-based identities to create long-term electoral vote banks. It has been a determinant of political participation, voting behavior and almost all other aspects of Indian Politics. Though Casteism has also been contributing towards continuation of socio-economic inequalities, what is more alarming is the mixing of caste and politics resulting into 'Politicization of Caste' in contemporary Indian Polity which has become a grave challenge on the way of deepening of the democracy.

Deepening democracy in India is getting developed through observation and following the effective participation of social movement in India, possibility, practicality and feasibility, educational status of Indians, political consciousness and of commoners, political movement of women, Dalits, Adivasis, minorities of society, grass roots level democracy, emergence of regional political parties, state and civil society : democracy and development, the state of good governance in India, the State of cultural diversity, the continuation of lineage of colonial official hegemony, the complex relationship of between state and democracy, the persistence of religious intolerance.

Right to Vote: means nothing to a hungry person for him/her the first requirement is food. Therefore poverty is considered as the greatest challenge to Indian democracy. It is, in fact, the root cause of all kinds of deprivations and inequalities. Poor people are being exploited at every phase of life by the politicians. Political liberty without economic equality is meaningless. Poor people can never take impartial interest in the politics of the country. Without participation of the masses democracy cannot work.

Poverty: is attributed to many factor, one of which is mass unemployment and under employment. A large number of people in rural areas do not have regular and adequate work. In urban areas also, the number of educated unemployed is very high. The growing population is regarded as the root cause of poverty, though population is the greatest resource in the country.

Corruption: is one of the biggest threats to democracy corruption in public life has been a major concern in India. In fact, corruption is rampant in all spheres of life, be it land and property, health, education, commerce and industry, agriculture, transport, police, armed places of spiritual pursuits. Corruption continues to exist in covert and overt ways at all three levels political, bureaucratic and corporate sector. The tentacles of corruption have effected all organs of government, even including the judiciary.

Education: being the most fundamental need of any developing country, should be the number one priority for India because it is pre-requisite for the success and survival of democracy. Democratic values like liberty, fraternity, justice, equality, co-operation and dignity of individual etc., are applied to education to make more meaningful, effective and relevant. The concept of education for democratic citizenship considers democracy to be the aim and method of instructions. If democracy has to become vibrant, people are to participate fully in it. An educational concept rooted in democracy, and which practices democratic method instruction, helps student upgrading the necessary

democratic skills and values. Women's participation: is a central element of democracy and the nature and degree of women's participation is a key indicator of the quality of democratic culture. Though India is the world's largest democracy, women in India still find themselves underrepresented and far removed from decision making levels. They face many political, socio-economic ideological and psychological obstacles which need to be removed to enable their equal participation in all spheres of life. Women's in the economy, in academic and the media are fundamental to democracy and essential to the achievement of sustainable development and peace in all contexts. The goal of democracy "of the people, for the people and by the people" cannot be fully realized without active female participation in politics. That is why, beside constitutional provisions, several laws have been enacted, policies have been made and implemented and institutional reforms have been carried out for the empowerment of women by the government of India. The 73rd and 74th Constitutional Amendment Acts in 1993 milestones in the process of political empowerment of women.

DR. B.R. AMBEDKAR'S VIEWS:

Dr. Bhimrao Ramji Ambedkar (1891-1956) 'a symbol of revolt' was one of the front-ranking nation-builders of modern India. He is popularly known as the 'pioneer' who initiated the 'liberation movement' of roughly sixty-five million untouchables of India. Dr. Ambedkar, the chief architect of Indian Constitution. Dr. Ambedkar believed that in democracy revolutionary changes in the economic and social life of the people are brought about without bloodshed. The conditions for that are as follows. There should not be glaring inequalities in society, that is privilege for one class; the existence of an opposition; equality in law and administration observance of constitutional morality no tyranny of the majority moral order of society; public conscience addressing the constituent assembly, he suggested certain devices essential to maintain democracy, constitutional methods, not to lay liberties at the feet of a great man, make a political democracy a social democracy.

In views of Dr. Ambedkar, political democracy cannot succeed without social and economic democracy. For him, the best mode of achieving socio-economic democracy is to achieve political democracy at the first instance. The importance of ideas of political, social and economic democracy lies in the fact that, rights cannot be enjoyed by the citizens of any nation in the absence of them. The co-existence of all three democracies is imperative to achieve the goals of equality and fraternity as enshrined in our constitution in Preamble. Underlining the importance of democracy. Dr. Ambedkar stated that, "It seems to me that

there lies on us very important duty to see that democracy does not vanish from the earth as the governing principles of human relationship. If we believe in it, we must both be true and loyal to it. We must not only be staunch in our faith in democracy, but we must resolve to see that whatever we do not help the enemies of democracy to uproot the principles of liberty, equality and fraternity. He also expressed a caution and stated that, these three concepts i.e., liberty, equality and fraternity cannot be separated from each other and cannot be treated in trinity. The combination and coexistence of these will only serve the purpose and object of true democracy.

II. CONCLUSION

Despite the preamble of Indian Constitution recognizes India as a Democratic nation endeavoring to secure to the citizens of India, Justice, Liberty, Equality and Fraternity, there is a lot of disparity and discrimination in the land of India. The Government of India Act, 1935 enacted during British days and having undergone about 100 amendments, now comprises of 395 Articles divided in 22 parts and 12 schedules, which broadly imbibes and adopts democratic values. In India, today's debates on tolerance and intolerance upon all forms of democracies like social, political and economic as well as the real solution to maintain peace and harmony in the society, but caste divides the society, thereby resulting in absence of equality and hampering the existence of true democracy. Therefore, all democratic governments must follow the Constitutions rules and regulations that are merged for the sake of the people. Then all the democratic governments and countries will be existing/existed in the safe manner foreverlasting.

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An Instructional Model of ASEAN Cross Cultural Learning of CLMV Students in Mahachulalongkornrajavidyalaya University

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Abstract: -- The purpose of this research article was to develop and assess the quality of the instructional model of ASEAN cross cultural learning of CLMV students in Mahachulalongkornrajavidyalaya University. Multiphase mixed methods research applying quantitative research to extend qualitative results was used for research design. The qualitative target group was selected using purposive sampling whereas the quantitative sampling group was used two-stage random sampling. Interview guideline and questionnaires were used for measurement design. Qualitative data were classified and analyzed using content analysis and analytic induction. Quantitative data were analyzed by descriptive statistics and the developed model was validated by using LISREL program. Results showed that the instructional model of ASEAN cross cultural learning relating to consequent factors leading to a happy coexistence included 5 components as the following: 1) ASEAN cross cultural learning management; 2) components of ASEAN cross cultural learning; 3) ASEAN cross cultural learning process; 4) activities for cross cultural learning; and 5) coexistence with happiness following the principle of virtues for fraternal living (Saraniyadham). The developed model had its possibility, validity, appropriateness and benefit for the related students and instructors. The result of quantitative quality assessment for creating a generalizability model by validating the consistency between structural equation model of the instructional model of ASEAN cross cultural learning developed from qualitative research and the model developed from the relation between components and variables of the instructional model of ASEAN cross cultural learning were both well coherent and fit with the empirical data (Chi-square = 140.33, df=116, p=0.062, GFI=0.98, AGFI=0.95, RMR = 0.023). It, thus, clearly showed that ASEAN cross cultural learning management, components of ASEAN cross cultural learning, ASEAN cross cultural learning process and activities for cross cultural learning were capable of promoting a happy coexistence.

Keywords — ASEAN, Instructional Model, CLMV students, Cross Cultural learning.

I. INTRODUCTION

Mahachulalongkornrajavidyalaya University is a Buddhist university and has been established as a government university since 1997. The university has developed both hardware and software aspects in order to prepare learners to be ready for the development of being a center of Buddhism in national and international levels continually. The main purpose of educational management is also related to ASEAN Community (ASEAN refers to the Association of Southeast Asian Nations) that is the education for encouraging each other by training and conducting research including Southeast Asia Studies. Students from educational institutes are encouraged to realize and understand each other by sharing knowledge between ASEAN countries that related to the third pillar of ASEAN cultures and societies. The target of this cooperation is to build the unity within community by sharing and supporting each other as in [1], [2]. For this reason, lectures and instructors should be able to organize classroom activities to increase student's

learning in various ways and covers with five aspects consisted of 1) cognitive domain, 2) affective domain, 3) psychomotor domain, 4) skills and 5) integration. These are learning models for international learning as in [3].

In the university community, it is an educational institute of students who are different in races, languages and traditions living together in the same campus. Activities have been organized by students to enhance living together peacefully which is the main purpose of educational management that the faculty members wish to see them to encourage each other to cooperate and do activities together creatively and also complement each other. According to their ethnicity or country, they are not divided into groups. On the other hand, when the understanding occurs and the coordination in the activities of the university can be easily carried out both in the classroom and outside the classroom which is in accordance with the goals of the university that focuses on training students to have both knowledge and morality applying into the society when they graduate from the university and return to their home countries.

Mahachulalongkornrajavidyalaya University has students who are diverse and different in races, languages, religions

and traditions especially students who come from CLMV countries consisted of Cambodia, Laos, Myanmar and Vietnam. They need to live together on campus, but from this distinction resulting in the management of education or living and activities being separate both inside and outside the classroom. Therefore, the university needs to find ways or learning methods to manage learning in order to encourage cross cultural learning for students who are the host to have a better understanding of the culture of students from ASEAN countries in order to have effectively learning and adapting to understand other cultures in ASEAN.

II. RESEARCH OBJECTIVE

The objective of this research article was to develop and assess the quality of the instructional model of ASEAN cross cultural learning of CLMV students in Mahachulalongkornrajavidyalaya University.

III. SCOPE OF RESEARCH

This research article is designed by using a multiphase mixed methods research design. The population of this research is students from Mahachulalongkornrajavidyalaya University and the target group are lectures and educators from CLMV countries. The content used in this study consists of 1) cultural concepts, 2) ASEAN culture in CLMV countries, 3) religious culture, 4) cross cultural learning, 5) learning management using research based learning and 6) model of cross cultural learning management.

IV. METHODS

Multiphase mixed methods research applying quantitative research to extend qualitative results was used for research design. The qualitative target group was selected using purposive sampling whereas the quantitative sampling group was used two-stage random sampling. Interview guideline and questionnaires were used for data collection. Qualitative data were classified and analyzed using content analysis and analytic induction. Quantitative data were analyzed by descriptive statistics and developed model was validated by using LISREL program. Four phases were designed in this research. The first phase used field study with in-depth interview for studying case studies that are being best practices of cross cultural learning in CLMV countries. Phase 2 used focus group discussion to develop and examine ASEAN cross cultural learning management in CLMV countries. Phase 3 used the model of ASEAN cross cultural learning management in CLMV countries for conducting workshop with

Mahachulalongkornrajavidyalaya University students. In phase 4 was a quantitative research design to assess the quality of the developed model. Evaluation of the quality of ASEAN cross cultural learning management model of Mahachulalongkornrajavidyalaya University students by examining the validity of the causal relationship model developed. Population and sample group were undergraduate students who registered in Mahachulalongkornrajavidyalaya University in academic year 2018. Determine the size of the sample group by using the formulas of Hair and others (1998) as in [4]. The sample size is 10 people per 1 parameter. Two-stage random sampling method can be used. Questionnaires were used for data collection and quantitative data were analyzed using descriptive statistics. In the hypothesis test, the research used validation of the structural equation model with the LISREL program. The results can be summarized as follows.

V. RESULTS

In analyzing the data of this model, there are 5 latent variables: ASEAN cross cultural learning management (LEARNASE), components of ASEAN cross cultural learning (COMASE), ASEAN cross cultural learning process (PROASE), activities for cross cultural learning (ACTASE) and coexistence with happiness (HAPLIVE) and 23 observed variables were used for the analysis.

Results of quantitative quality assessment is to create a pattern that can be used for generalizability model by examining the consistency between the structural equation model of ASEAN cross cultural learning management in CLMV countries which developed from the qualitative research including the experimental model and empirical data obtained from the real condition of cross cultural learning as perceived by Mahachulalongkornrajavidyalaya University students. The results showed that the developed model from the relationship between the composition and variables of the model of ASEAN cross cultural learning management in CLMV countries fit with empirical data (Chi-square = 140.33, df = 116, p = 0.062 GFI = 0.98, AGFI = 0.95, RMR = 0.023).

When considering the predictive coefficient (R-square) of the latent internal variable structure equation, it found that the components of the cross cultural learning (COMASE) had the forecast coefficient equal to 0.64, indicating that the variables within the model of ASEAN cross cultural learning management (LEARNASE) can explain the variance of components of ASEAN cross cultural learning for 64.00 percent. ASEAN cross cultural learning process (PROASE) has a predictive coefficient equal to 1.00, indicating that the variables within the model of ASEAN

cross cultural learning management (LEARNASE), able to explain the variance of ASEAN cross cultural learning process for 100 percent. Activities for cross cultural learning (ACTASE) has a predictive coefficient of 0.85, indicating that the variables within the model of cross cultural learning management (LEARNASE) can explain the variance of activities for cross cultural learning at 85.00 percent. Coexistence with happiness (HAPLIVE) has a predictive coefficient of 0.82, indicating that the variables within the model of ASEAN cross cultural learning management (LEARNASE), components of ASEAN cross cultural learning process (PROASE), and activities for cross cultural learning (ACTASE) can explain the variance of coexistence with happiness at 82.00 percent.

When considering the correlation matrix between latent variables, it indicated that the correlation coefficient range between latent variables was in the range of 0.74 to 1.00, with all pairs having the same directional correlation and positive correlation values. The variables with the highest correlation coefficients are ASEAN cross cultural learning management (LEARNASE) and the cross cultural learning process (PROASE) with correlation coefficients equal to 1.00 indicating that when increasing the management of ASEAN cross cultural learning, the level of ASEAN cross cultural learning process is also increased. The next variables with correlation coefficients followed by ASEAN cross cultural learning process (PROASE) and activities for cross cultural learning (ACTASE) with correlation coefficients equal to 0.92 indicating that when the level of ASEAN cross cultural learning process increase, the level of activities for cross-cultural learning has also increased. In addition, correlation coefficients of ASEAN cross cultural learning management (LEARNASE) and activities for cross cultural learning (ACTASE) is also equal to 0.92 indicating that when the level of ASEAN cross cultural learning management, the level of activities for cross cultural learning has also increased and showed a high level of correlation.

When considering the direct effect and indirect effect between variables in the model, it was found that the relationship between the ASEAN cross cultural learning management variables (LEARNASE) and coexistence with happiness (HAPLIVE) is equal to 0.89 ($r = 0.89$) is a direct influence 0.49 and indirect effect is 0.40, the total effect is 0.89. Direct and indirect effects do not affect the coexistence with happiness significantly. However, the total effect size has a significant effect on coexistence with happiness. Detail of analysis results are shown in Table I and Fig. 1.

Table I Statistical analysis of correlation between latent variables and factor analysis of developed model

Variables	COMASE			PROASE			ACTASE			HAPLIVE		
	TE	IE	DE	TE	IE	DE	TE	IE	DE	TE	IE	DE
LEARNASE	0.80** (0.04)	-	0.80** (0.04)	1.00** (0.04)	-	1.00** (0.04)	0.92** (0.04)	-	0.92** (0.04)	0.89** (0.04)	0.40 (5.90)	0.49 (5.91)
COMASE	-	-	-	-	-	-	-	-	-	0.29** (0.04)	-	0.29** (0.04)
PROASE	-	-	-	-	-	-	-	-	-	0.02 (0.00)	-	0.02 (0.00)
ACTASE	-	-	-	-	-	-	-	-	-	0.16** (0.08)	-	0.16** (0.08)
Statistics	Chi-square = 140.33 df = 116 p = 0.062 GFI = 0.98 AGFI = 0.95 RMSEA = 0.023											
Variables	LEARN1	LEARN2	LEARN3	LEARN4	LEARN5	LEARN6						
Reliability	0.50	0.54	0.55	0.59	0.53	0.59						
Variables	COM1	COM2	COM3	PRO1	PRO2	PRO3						
Reliability	0.73	0.82	0.92	0.68	0.75	0.77						
Variables	PRO4	PRO5	ACT1	ACT2	ACT3							
Reliability	0.59	0.80	0.85	0.89	0.89							
Variables	HAPLIV1	HAPLIV2	HAPLIV3	HAPLIV4	HAPLIV5	HAPLIV6						
Reliability	0.82	0.82	0.85	0.89	0.89	0.92						
R SQUARE	COMASE			PROASE			ACTASE			HAPLIVE		
	0.64			1.00			0.85			0.82		
Correlation matrix between latent variables												
Latent Variables	COMASE	PROASE	ACTASE	HAPLIVE	LEARNASE							
COMASE	1.00											
PROASE	0.80	1.00										
ACTASE	0.74	0.92	1.00									
HAPLIVE	0.81	0.89	0.84	1.00								
LEARNASE	0.89	1.00	0.92	0.89	1.00							
Remarks: **p < .01, TE = Total Effect, IE = Indirect Effect, DE = Direct Effect												

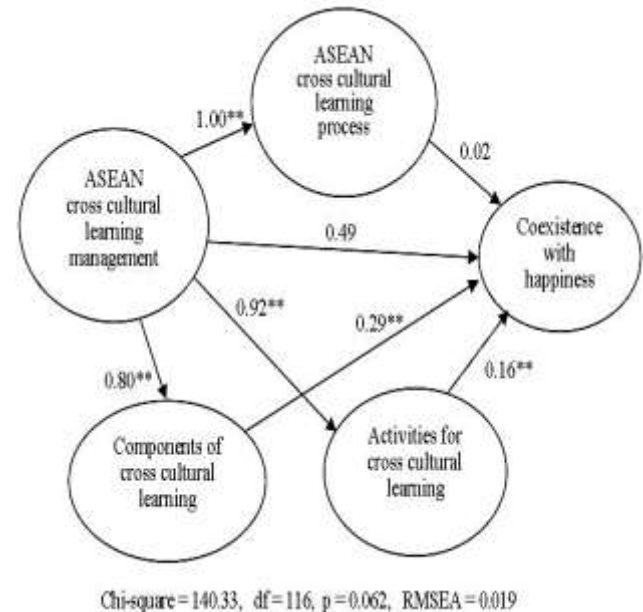


Fig.1 A causal model of ASEAN cross cultural learning of CLMV students in Mahachulalongkornrajavidyalaya University

VI. DISCUSSIONS

In workshop activities in accordance with the model of ASEAN cross cultural learning management in CLMV

countries, it was found that participants were interested in continuing to participate in activities starting with Think-Pair-Share, brainstorming, knowledge sharing, and group activities in order to develop learning innovations through a storyline and planning for innovation with mind mapping technique. Results from students' reflections after participating in the activity indicated that they knew how to obtain information and understand through additional activities with research based learning, systematic presentation through the planning process, creative thinking, and communicate to the public with fully understand others. These are learning activities that apply research based learning of conducting ASEAN cross cultural learning for CLMV students in Mahachulalongkornrajavidyalaya University in accordance with the research as in [5], research on teaching and learning management that students use as part of the learning process by integrating teaching by using research-based method along with content analysis. The research found that students are interested in pursuing knowledge and have skills in acquiring self-knowledge whereas the research that showed in [6] that studies on the continuous professional development of measurement and evaluation using research as a tertiary base in Thailand. The researcher suggested that research based learning is important for Thai university research. Indicators reflected the success of student learning assessment by using the learning process with 3 stages of research: 1) creating self-thinking, 2) focusing on change, and 3) reflecting change and presenting development guidelines. The development results through this process led to the development of the participants using research based learning. In addition, the teaching and learning management that is used as a base is still widely seen in the management of Thai education that has shown in [7] to synthesize the research results that are used by learning and using research is the base of Thai education. It found that research is aimed at developing learners in basic education level. The variables found from synthesis are work skills, thinking skills, academic achievement nature of researchers, basic research and problem solving skills, critical thinking including seeking knowledge and attitudes. It can be seen that learning management is a teaching technique that helps to develop a variety of skills. Therefore, this research is to develop cross cultural learning management and choose to use for learning management as a base to develop ASEAN cross cultural learning of CLMV students.

For the model of learning management across ASEAN from theory into practice, the process of developing a model for this research started with a qualitative study to develop a conceptual framework for research in a manner that shows the relationship between variables in order to obtain guidelines for developing field area variables from in-depth

interviews, surveys and observations. According to variables and issues of interest to study, the findings obtained from in-depth interviews led to the addition of variables in the research framework to be clearer and important, consistent with the social and cultural context. Model and practices of people from different cultural backgrounds under the similarities of Buddhism, the variables are clear and begin to develop the learning activity management process. Develop a learning set about the religious culture of CLMV countries creates a learning management plan. To be used as a guideline for organizing workshop activities and then conduct an examination of the appropriateness and feasibility of conduct from education experts and ASEAN education. When the pattern is clear in every component and there is a process that is ready, there is a workshop activity that is designed into practice. Based on the results of the development of learners with practical activities, the ASEAN cultural innovation design program has 24 tasks which participants will be able to create media or innovations about ASEAN culture to disseminate knowledge about religious culture. In ASEAN, however, in the development of innovation that are some video clips have been developed from students. There is the development of 24 group tasks showing in mind map style, but they have not completed video clips as the innovation. It appears the reflection and thinking of the students who attended the workshop because of having the opportunity to learn together, do group activities, practice searching information from online media, present work via online media, to express opinions through the process of ASEAN cross cultural learning which is an essential skill for learners in the 21st century as in [8] that study "The relationship between skills in the 21st century with digital technology skills", by presenting the results of the study that are the necessary skills in the 21st century obtained from the synthesis of 25 articles in total of 7 main areas consisting of academic skills, information management, communication, collaborative learning, creative thinking, critical thinking and problem solving. Related context skills have been included for this study such as ethical awareness, cultural awareness, flexibility, self-directed learning, and lifelong learning. From the mentioned reasons, it shows that model of ASEAN cross cultural learning management can be developed from theory into practice and can be useful for teaching and learning management that is consistent with the development of learner skills in the 21st century.

VII. CONCLUSION

The result of quality assessment, learning management model both qualitative and quantitative concluded that managing ASEAN cross cultural learning will result in a

happy living place that requires the components of ASEAN cross cultural learning content such as patterns of self-practice, principles of living together, and respect for Buddhism which is used as an important part in the design of the learning process management for students to learn across ASEAN culture in accordance with the 5-step process: 1) open mind to receive a new culture, 2) ready to learn with the difference, 3) prepare mind to the situations, 4) understand the behavior of other students, and 5) adjust paradigm shift of culture. The model of activities is to promote cross cultural learning consisted of exchanging learning from their own experiences and cultural activity demonstration through collaborative learning. In summary, ASEAN cross cultural learning management, components of ASEAN cross cultural learning, ASEAN cross cultural learning process and activities for cross cultural learning can promote a happy living together in the society.

[8] E.V. Laar, and others, "The relation between 21st century skills and digital skills: A systematic literature review," *Computers in Human Behavior*, Vol.72, pp. 577-588, July 2017.

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