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## A New Longitudinal Examination on the Relationship between Teaching Style and Adolescent Depression

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### ABSTRACT

Guided by the theoretical framework of Baumrind's parenting style, this study aimed at providing a better understanding of the relationship between teaching style and adolescent depression. The panel data is from the Taiwan Educational Panel Survey (N=654). Findings showed that the effect of teaching style on adolescent depression had different pattern across junior and senior high school students. And there is interaction effects between teaching style in junior and senior high school. Authoritarian teaching style played a more significant role for junior high students, and this effect can last especially among those whose perception of teaching style is authoritarian and authoritative in high school. And permissive teaching style was more important in senior high stage, it could decrease the levels of depression especially for those who perceived teaching style is indifferent and authoritarian in junior high school. Implications for future research were discussed.

#### Keywords:

adolescent depression; teaching style; longitudinal study; interaction effect

### 1. Introduction

Depression it is not limited to adults, actually adolescents have to deal with many changes that could have an influence on their mental health, and they are very vulnerable to depressive moods (Compas, Ey, & Grant, 1993). Based on research carried out by the John Tung Foundation (2011), 18.1% of 5056 adolescents from five cities in Taiwan experienced serious depression emotion. Therefore, it's important to devote more attention to adolescent depression.

Gender is one individual-level factor will influence adolescent depression. Previous literature has revealed that female adolescents tended to emphasize private self-consciousness and experience more stressful events, which in turn lead to an increase in depressive symptoms (Lewinsohn, et al., 1994; Kandel & Davies, 1982). However, Petersen et al. (1993) suggested that boys and girls have different patterns of change in depression in which the degree of depression is stable in the 8th grade for boys but is increased for girls. Therefore we wanted to figure out whether the impact of gender on depression is different across junior and senior high school.

As for external factors, one of the theories about depression is known as social support theory. Malecki and Demaray (2003) defined social support as "an individual's perceptions of general support or specific supportive behaviours (available or acted on) from people in their social network, which enhances their functioning or may buffer them from adverse outcomes". Holahan and Moos (1981) pointed out that there is

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a negative correlation between social support and psychological maladjustment, which means perceived social support may reduce psychological distress to some extent. In the classroom context, teachers are critical sources of social support, emotionally warm relationship between teachers and students (characterized by open communication, support, and involvement) provides students with a sense of security within school settings, which in turn promotes exploration and comfort, as well as social, emotional, and academic competence (Birch & Ladd, 1997; Pianta & Steinberg, 1992; Khamis, 2009; Cassidy & Shaver, 1999; Cappeliez et al, 1993; Richman, Rosenfeld, & Bowen, 1998; Pianta, 1999). The quality of interaction can be affected by teaching style directly and indirectly. Teaching style refers to the strategies and methods teachers use in order to achieve educational goals. It is a derivation of models of parenting styles from Baumrind and has been applied to classroom context. Baumrind (1978) first identified two dimensions of parenting style as responsiveness and control, responsiveness refers to the caring and warmth parents exhibit toward a child; control refers to the strictly rules or even criticism for misbehaviors. Baumrind developed this two dimensions to derive a four-fold classification of parenting styles: indifferent, permissive, authoritative and authoritarian. Results about the relationship between parenting style and adolescent were basically consistent, authoritative parenting style is best for children's psychological functioning and indifferent parenting style is the worst (Lamborn, Mounts, Steinberg, & Dornbusch, 1991; Radziszewska, Richardson, Dent, & Flay, 1996; Pittman & Chase-Lansdale, 2001; Piko & Balazs, 2012; Milevsky, Schlechter, Netter, & Keehn, 2007). But with different culture and characteristic of adolescents, the result will be different. Steinberg, Blatt, and Cauffman (2006) found that the children under four kinds of parenting style did not differ with respect to reports of symptoms of depression in a sample of serious juvenile offenders, and Gracia and Gracia (2009) showed that in Spain the optimum style of parenting for adolescents' emotion and psychosocial adjustment is the permissive one.

As an analogue of parenting style, these four kinds of teaching styles were used in this study. Roan-Belle (2013) pointed out that indifferent teachers (low control, low responsiveness) were detached from the classroom, they were neither demanding nor responsive. Permissive teachers (low control, high responsiveness) created very supportive and nurturing educational environment for students, however, they often had low demandingness. Authoritarian teachers (high control, low responsiveness) believed that compliance was more important than developing student competence, and they tended to minimize the importance of emotional connections with students and place higher value on respect and obedience. Finally, authoritative teachers (high control, high responsiveness) focused on building students' discipline and competence, and they also recognized the importance of establishing strong emotional connection with students.

Since Pellerin (2005) applied Baumrind's typology of parenting style to high school, a few researchers have investigated the effect of teaching style on student outcomes (e.g. Walker, 2008; Dever & Karabenick, 2011). Walker (2008) explored the motivation of students in classrooms with three teachers of different styles: authoritative, authoritarian, and permissive, and the best student outcomes (high motivation and achievement) were associated with an authoritative teaching style. Dever and Karabenick (2011) examined the effects of the two facets of authoritative teaching—high academic pressure and caring for students—on interest in mathematics for middle and high school students, and the results suggested students' ethnicity is a moderator variable, the authoritative teaching style predicted higher levels of interest in the case of Hispanic students, but authoritarian teaching (high pressure and low caring) was positively related to interest for Vietnamese students. However, to our knowledge, no previous research investigating the effect of teaching style on students' depression. Therefore, the present study was aimed at providing a better understanding of the effect of teaching style on adolescent depression, the current study used panel data across junior and senior high schools to investigate:

- (a) Whether the effect of teaching style in senior high schools has the same pattern as has been exhibited in junior high schools.
- (b) What's the unique effect of teaching style in junior and senior high school on depression?
- (c) Whether there is aggregate effect of junior and senior high stage teaching style on senior high students' depression.

## 2. Method

### 2.1. Participants

This study made use of data from the Taiwan Educational Panel Survey (Chang, 2005; 2008) for Wave 2 (2003) Junior High School and Wave 4 (2007) Senior (Vocational) High School. The same students are being followed in both 2003 and 2007. The Taiwan Education Panel Survey is a national longitudinal project initiated by Academia Sinica and jointly funded by the Ministry of Education, the National Science Council, and Academia Sinica. A multistage stratified sampling method was used, and three classes from each school were sampled, with 15 students selected in each class at random. The dataset contained a sample of 9th graders in junior high school and 12th graders in senior high school as track samples. The sample size in this study was 654; the number of boys was 320 (48.9%), and the number of girls was 334 (51.1%).

### 2.2. Instruments

#### 2.2.1. Depression

Depression as the dependent variable was measured by 6 items. Participants were asked: "In this semester, did these following things happen to you?" Items included, "felt depressed", "felt lonely", "didn't want to interact with others," "wanted to scream, fight, and quarrel", "couldn't sleep well", "head numb." These 6 items assessed the self-reported frequency of depression experienced over the semester on a four-point Likert scale: never (assigned 1), sometimes (assigned 2), frequently (assigned 3), very frequently (assigned 4). The scores for each item were added to form a new variable called depression. The higher the scores were, the more severe the depression was considered to be. Factor loadings for the items in 2003 were all greater than .606, and Cronbach's alpha was .780. The factor loadings for the items in 2007 were all greater than .625, and the Cronbach's alpha was .806.

#### 2.2.2. Perceived Teaching Style

There were four items self-assessed by asking how many teachers behaved in a certain manner since the student started junior (senior) high school. Two of these items were averaged to measure "responsiveness" on the part of teachers: "When I express my ideas, the teacher will listen and try to understand." and "The teacher will praise me when I work hard." Another two items were averaged to measure "control": "The teacher may hurt my self-esteem when he or she tutors me.", and "The teacher always tells me not to do things that will embarrass him or her." Each item was measured on a five point Likert scale: none (assigned 1), 1-2 (assigned 2), 3-4 (assigned 3), 5-6 (assigned 4), more than 6 (assigned 5). Finally, responsiveness and control were split by the median, respectively, where scores greater than the medians were considered high responsiveness and high control, and scores lower than the median were labelled as low responsiveness and low control. Therefore, a new variable called teaching style was formed: low responsiveness and low control represented the indifferent teaching style; high responsiveness and low control represented the permissive teaching style; low responsiveness and high control represented the authoritarian teaching style, and high responsiveness and high control represented the authoritative teaching style. Students whose scores were exactly equal to the median were then eliminated, resulting in 654 students (320 boys and 334 girls).

## 3. Results

A chi-square analysis suggested that there were differences in the number of students across four perceived teaching style condition (indifferent/permissive/authoritarian/authoritative) in junior high school,  $\chi^2(3,654)=123.81, p<.001$ , and senior high school,  $\chi^2(3,654)=62.91, p<.001$ , see Table 1.

**Table 1.** Numbers of students across four perceived teaching style condition

Teaching style	Indifferent	permissive	authoritarian	authoritative	$\chi^2$
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Junior high	111	91	179	273	123.81**
Senior high	124	190	107	233	62.91**

More students perceived the authoritative teaching style in junior and senior high school. And compared with junior high stage, there were more students perceived permissive teaching and less perceived authoritarian teaching style in senior high school, which suggested senior high students felt more responsiveness and less control from teachers.

To investigate the differences in depression among the four groups of teaching styles, we considered each age stage (junior high stage in 2003/ senior high stage in 2007) in separate two-way ANOVAs, with sex (boy/girl) and perceived teaching style (indifferent / permissive / authoritarian /authoritative) as between-subjects factors. For junior high school students, the results showed significant main effect for teaching style,  $F(3,646)=6.431$ ,  $p=.000$ ,  $\eta^2=.029$ , but the main effect for sex and interaction effect between sex and teaching style were not significant,  $F(1,646)=3.14$ ,  $p=.077$ ; and  $F(3,646)=1.32$ ,  $p=.267$ . Post hoc comparisons (Tukey's HSD,  $p<.05$ ) showed that junior high students who perceived teaching styles as authoritarian ( $M=12.92$ ,  $SD=4$ ) were more depressed than those who perceived their teachers were indifferent ( $M=11.23$ ,  $SD=3.5$ ), permissive ( $M=11.41$ ,  $SD=3.03$ ) and authoritative ( $M=11.91$ ,  $SD=3.6$ ). As for those students in senior high stage, the interaction effect between sex and teaching style was also not significant,  $F(3,646)=.024$ ,  $p=.995$ , but the main effects for both sex and teaching style were significant,  $F(1,646)=16.04$ ,  $p<.001$ ,  $\eta^2=.024$ ; and  $F(3,646)=21.644$ ,  $p<.001$ ,  $\eta^2=.091$ , girls ( $M=12.15$ ,  $SD=3.5$ ) felt more depression than boys ( $M=11.24$ ,  $SD=3.72$ ) in senior high school,  $F(1,652)=10.488$ ,  $p=.001$ ,  $\eta^2=.016$ . Post hoc comparisons (Tukey's HSD,  $p<.05$ ) showed that senior high students who perceived teaching styles as permissive ( $M=10.19$ ,  $SD=2.77$ ) were less depressed than those who perceived their teachers to be indifferent ( $M=12.1694$ ,  $SD=4.19$ ), authoritarian ( $M=13.16$ ,  $SD=4.15$ ) and authoritative ( $M=12.03$ ,  $SD=3.28$ ). The different result of Post hoc comparison from junior high stage and senior high stage suggested that the role of teaching style was varied across different age groups, junior high students were more sensitive to authoritarian teaching style which was more likely to increase the level of depression, and the role of permissive teaching style became more important in senior high stage, students who under it reported less depression, see Table 2.

**Table 2.** ANOVA Results and Descriptive Statistics for Adolescent Depression by Teaching Style

Teaching Style	Depression $M(SD)$			
	Authoritarian	Authoritative	Permissive	indifferent
<b>Junior high students</b>	12.92(4)	11.91(3.6)	11.41 (3.03)	11.23(3.5)
Source	<i>df</i>	<i>F</i>	$\eta^2$	<i>p</i>
Teaching style	3	6.431	0.029	.000
Sex	1	3.14	0.000	0.077
Teaching style×Sex	3	1.32	0.000	0.267
<b>Senior high students</b>	13.16(4.15)	12.03(3.28)	10.19(2.77)	12.17(4.19)
Source	<i>df</i>	<i>F</i>	$\eta^2$	<i>p</i>
Teaching style	3	21.644	0.091	.000
Sex	1	16.04	0.024	0.000
Teaching style×Sex	3	0.024	0.000	0.995

To examine the aggregate effect of perceived teaching style on depression, we performed an analysis of covariance (ANCOVA) with sex, perceived teaching style of 2003 and 2007, as independent variables, with score on depression of 2003 as covariate, and with score on depression of 2007 as dependent measure, see Table 3. The results indicated that there was a significant effect of sex,  $F(1,622)=5.94$ ,  $p=.015$ ,  $\eta^2=.009$ . And the main effects for both perceived teaching style 2003 and perceived teaching style 2007 were conditioned by a interaction of them,  $F(9,622)=1.96$ ,  $p=.042$ ,  $\eta^2=.028$ . There was no significant interaction between Sex and

Perceived teaching style2003,  $F(3,622)=.80$ ,  $p=.49$ , nor the interaction between Sex and Perceived teaching style2007,  $F(3,622)=.45$ ,  $p=.72$ , nor the three-way interaction with Sex, Perceived teaching style2003, and Perceived teaching style2007,  $F(8,622)=.49$ ,  $p=.86$ . For the simple effect of senior high school teaching style, pairwise comparisons showed that for students who under indifferent teaching style in junior high school, after they entered senior high school, those who felt permissive teacher style were less depressive than those who felt indifferent ( $p=.002$ ) and authoritarian ( $p=.011$ ) teaching style. And for students under authoritarian teaching style in junior high school, after they entered senior high school, those who perceived teaching style is permissive felt less depression than those whose perception of teaching style is authoritative ( $p=.006$ ) and authoritarian ( $p=.003$ ). No other pairwise comparisons differed significantly among students who perceived teaching style as permissive and authoritative in junior high school. For the simple effect of junior high teaching style, pairwise comparisons showed that for students whose perception of teaching style was authoritarian in senior high school, among them whose perception of teaching style used to be authoritarian in junior high stage felt more depression than those under authoritative ( $p=.045$ ) teaching style. Students whose perception of teaching style was authoritative in senior high school, among them whose perception of teaching style used to be authoritarian in junior high stage felt more depression than those under indifferent ( $p=.001$ ) and authoritative ( $p=.015$ ) teaching style. According to the results of simple effect, we suggested that permissive teaching style of senior high stage played a more significant role among students who under the indifferent and authoritarian teaching style in junior high school, and authoritarian teaching style of junior high stage had a long negative effect on students whose perception of teaching style were authoritarian and authoritative in high school.

**Table 3.** ANCOVA Results of Senior High students' Depression using Their Depression Score in Junior High as the Covariate

Predictor	Sum of Squares	df	Mean Square	F	p
(Intercept)	2156.06	1	2156.06	226.79	.000
Junior Dep	1375.52	1	1375.52	144.686	.000
Sex	56.43	1	56.43	5.94	.015
Junior TS	83.28	3	27.76	2.92	.033
Senior TS	244.241	3	81.41	8.56	.000
Sex*Junior TS	22.84	3	7.62	.80	.494
Sex*Senior TS	12.74	3	4.25	.45	.72
JuniorTS*SeniorTS	167.64	9	18.63	1.96	.042
Sex*JuniorTS*Senior TS	37.41	8	4.68	.49	.86
Error	5913.3	622	9.51		

Nots: Junior Dep = Junior high school students' depression; Junior TS = Teaching style in Junior high school; Senior TS = Teaching style in Senior high school

#### 4. Conclusions and Discussion

This study contributed to a growing body of literature empirically demonstrating the effect of teaching style on students' outcome (Dever & Karabenich, 2011; Pellerin, 2005; Walker, 2008). One of this study's unique contributions was the finding that the effect of teaching style in senior high schools had different pattern with its effect on junior high schools. Junior high students who perceived teaching styles as authoritarian were more depressed than those who perceived their teachers were indifferent, permissive and authoritative. Senior high students who perceived teaching styles as permissive were less depressed than those who perceived their teachers to be indifferent, authoritarian and authoritative. However, this is inconsistent with the results of parenting style which suggested that authoritative parenting style was best

for children's psychological functioning and indifferent parenting style has the worst result (Lambom, Mounts, Steinberg, & Dornbusch, 1991; Radziszewska, Richardson, Dent, & Flay, 1996; Pittman & Chase-Lansdale, 2001; Piko & Balazs, 2012; Milevsky, Schlechter, Netter, & Keehn, 2007). One possible explanation for this difference is that relationship between parents and children is much closer than the relationship between teachers and students. That is to say, when parents make demands on their children, children will tend to accept their parents' advice or criticism, but if teachers do the same thing, it is likely to create conflict between teachers and students. Another potential is that the measurement of parenting style has been focused on mother or father in previous studies, but this study measured the perceived teaching style of the whole school, the aggregate effect of teaching style from many teachers may play a different role from the single one.

One question raised by the present study is why the effect of authoritarian teaching style on depression was strong for junior high students, whereas permissive teaching style became more salient for senior high students? This is an open question and definitely an area for future research. One possible explain is that, for early adolescents in junior high school, caring and learning may represent a sign of weakness, they want to be on their own and get rid of the control from significant adults (Finders, 1997), and seeking adult approval could be viewed by other students as a means of compensating for a lack of ability or inability to be autonomous (Davis, 2010). Thus, students at this stage are more sensitive to teachers' control rather than responsiveness. As late adolescents in senior high school moving into pursuing prosocial and responsible goals, they tend to make and keep friends, to be helpful to students and teachers, also make efforts to be dependable, responsible, and successful. Therefore, the encouragement and appreciation from teachers are very valuable at this stage, and the effect of permissive teaching style become more salient.

Another important finding was that perceived teaching style had an influence on depression over time. The effect of authoritarian teaching style on depression was powerful for junior high students and the effect would be maintained after students entered into high school, especially for those whose perception of teaching style was authoritarian and authoritative in high school. It illustrated the critical and continued role of authoritarian teaching style in adolescents' depression throughout development. Besides, based on the result of simple effect, permissive teaching style in senior high school played a more significant role among students who under the indifferent and authoritarian teaching style in junior high school. These results can be explained by the aggregate effect of teaching style, the permissive teaching style (high responsiveness and low control) in senior high school can decrease the levels of depression for students who lack the responsiveness from junior high teachers, and authoritarian teaching style (high control and low responsiveness) in junior high still has a positive effect to the levels of depression for students who continue receive the high control from teachers in senior high school. Therefore, to decrease to levels of depression, teachers should give more responsiveness and less control to students no matter in junior or senior high school.

To our knowledge, this is the first study used longitudinal data to investigate the influence of teaching style on adolescent depression. Thus, these results had several implications for theory and research, which were discussed below. (a) Although we included four kinds teaching style and explored different patterns contributing to depression, there are other predictors, mediators, and identity outcomes that should be studied in the future. For example, we focused on the role of teachers because it is a source of social support in classroom (Pianta & Steinberg, 1992; Birch & Ladd, 1997). However, it is also important to understand how other forms of social support (e.g. parents and peers) may influence adolescents' depression. Besides, the effect of perceived teaching style may prove more robust as it take into account both ecological variables and child characteristics that may impact the effect of teaching style. (b) Like parenting style, teaching style are culturally embedded. A useful next step for research would be determine whether adolescents in other cultures share the same patterns in our Taiwanese samples. Contrasting more family oriented or collectivistic cultures would be informative. (c) Given that the current results demonstrated the permissive teaching style is the best for psychological functioning, but other research suggested that authoritative teaching style benefits for student motivation and achievement (Pellerin, 2005; Walker, 2008), what is the best recommendation for teaching style? It is important to note that many students with high GPA experienced high pressure and negative emotion, an additional and essential extension of this work should examine what kind of teaching style is benefit for students' mental health and achievement.

Together, these results shed light on the development of adolescents' interpretation of four-fold teaching style, these four kind teaching style may play a somewhat different role in junior and senior high students' depression. We found that perceived authoritarian teaching style played a more significant role for junior high students, and this effect can last especially among those whose perception of teaching style is authoritarian and authoritative in high school. And perceived permissive teaching style was more important in senior high stage, it could decrease the levels of depression especially for those who perceived teaching style is indifferent and authoritarian in junior high school.

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## Learning Styles in the Context of Reasoning and Problem Solving Ability: An Approach based on Multivariate Analysis of Variance

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### ABSTRACT

Reasoning and problem solving skills are not just for researchers; they are also progressively significant for making knowledgeable decisions in our everyday lives. Showing variations in learning styles have any influence on these skills? The current state of research address the learning styles in context of reasoning and problem solving ability. High school students (598) completed the reasoning ability test, problem solving ability test and learning style inventory. SPSS software was used for evaluating data obtained from three measurement tools. The entire three tools were validated through different techniques and found significant and acceptable. The data was analysed by using MANOVA and Scheffe's post hoc test. The results indicated that participants showed variations in reasoning and problem solving ability while using learning styles. Moreover, students having assimilating and diverging learning styles possess better reasoning and problem solving ability skills. The results of this research will contribute to the literature of learning styles and cognitive abilities, as well as provide a wide range of implications for class room teachers, curriculum developers, researchers and educational planners.

#### Keywords:

learning styles; reasoning ability; problem solving ability; multivariate analysis of variance

### 1. Introduction

During the last few decades, there has been a radical change in every field on account of scientific inventions and technological advancement. To meet the challenges and requirements of this fast developing society, young people need to grow in the ability to think rationally and to express their thoughts clearly. Independent thinking, careful analysis and objective assessment contribute to success in any field (Gardner, 1985). The cognitive abilities play an important role in daily routines and patterns of the learners in general and education in particular. It is universally acknowledged fact that the progress of any nation depends mainly on the utilization of potential of its intellectually talented individuals to the maximum (Asch, 2002).

The students use different thinking styles to accomplish new information and to approach and manage a learning task, selecting those styles with which they are at ease (Zhang & Sternberg, 2000). Students differ in how they receive, recognize and process the information. There are various cognitive factors whose recognition is very essential and they help the learner in academic pursuits. Does receiving and processing information make difference in reasoning and problem solving ability? The investigator tries to answer this question by investigating learning styles in relation to reasoning and problem solving ability.

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## 1.1. Relevant Prior Research

### 1.1.1. Learning styles

The concept of “learning style” was introduced by Dunn and Dunn in 1960 (Can, 2009). According to them learning style is the way through which each learner begins to concentrate on, process, absorb, and retain new and difficult information (Dunn and Dunn, 1992; 1993). Similarly Kolb (1984) describes learning styles as individual preferred ways while they receive and process information. The purpose of knowing the learning style of students are empowered to understand their strengths and weaknesses, maximize their learning potential, make transitions to higher levels of personal and cognitive functioning and it allows educators to cover materials in a way that best fits the diversity of the classroom. One of the reasons for the development of this term is that learning style has practical application predominantly in the areas of teaching and learning (Baraz, Memarian and Vanaki, 2014).

Subsequently, various studies were conducted on the application of learning styles in several cognitive variables. For example the results of Verma (1988) indicated that extrovert and introvert students were more alike than different in their learning style preferences. Anxiety and learning style preferences are not contingent upon each other (Verma, 1989). While as Verma and Tiku (1990) indicated that the main and interactional effect of socio-economic status and intelligence was not found significant on learning styles. Further, no significant relationship has been found between creative personalities and preferred learning styles of adolescent female students (Verma, 1992). Besides, Verma (1997) reported intellectually gifted adolescent students prefer different learning styles.

However, Afshar, Sohrabi and Mohammadi (2014) found no significant relationship between the learners’ learning styles and their English language achievement. The students’ achievement levels did not differ significantly according to their learning styles (Bicer, 2014). The results of Eishani, Saad and Nami (2013), also showed that there is significant relationship between learning styles and creativity. The results of Hames and Baker (2014) indicated that the global–sequential, active–referential, and visual–verbal FSILS learning styles scales are related to performance on cognitive tasks.

### 1.1.2. Reasoning Ability

The development of reasoning skills, its improvement and various approaches have brought out immediate concerns of educators, psychologists, and philosophers for decades (Bhat, 2014). Reasoning is a very important aspect of human existence. In today’s complex world, the ability to think and reason logically is essential for everybody. The ability to reason is indispensable when problem solving skills are required. Without reasoning, already acquired knowledge and experiences cannot be applied to new situations. According to Leighton & Sternberg (2004), “Reasoning, the mediator leaves its mark on almost everything we do and think. This is because almost everything we do and think involves drawing conclusions. When we learn, criticize, judge, infer, evaluate, optimize, apply, discover imagine, devise, and create, we draw conclusions from information and form our beliefs”.

The number of researchers (Ertepmar, 1995; Cavallo, 1996; Abdu, 1998; Johnson and Lawson, 1998; Sungur et al. 2001; Kuhn and Holling, 2008; Tekkaya and Yenilmez, 2006; Oloyede 2012, Gupta, 2012; Nnorom, 2013; Kanchan and Sharma, 2013) have found reasoning ability influence on academic achievement in various school subjects. Further, gender differences have been found in reasoning ability by some researchers (Valanides, 1997; Yenilmez et al. 2006; Kohn and Holling, 2008; Jeotee, 2012), while Gupta (2012) found no significant gender difference in reasoning ability. However, girls were better in achievement than boys (Yenilmez et al. 2006; Valanides, 1997).

### 1.1.3. Problem Solving Ability

The ability to solve novel problems is one of the hallmarks of human cognition, and the study of this phenomenon plays a central role in the foundation of artificial intelligence. Early models of problem solving provided some of earliest evidence for the computational nature of human thought. These accounts remain some of the most precise and detailed in the literature on mental phenomena, and the topic remains a central and important one that deserves continued study by scientists in the cognitive system community (Langley and Trivedi, 2013).

Having good problem solving abilities makes huge differences in the career of students. It helps them to overcome the day-to-day problems more conveniently and easily. They comprehend the classroom situations easily and show better academic pursuits. Besides, those students who possess good problem solving ability, tend to have more critical thinking, decision making, comprehension, which leads them to attain their goals in a better way in almost all walks of life. Therefore, it is imperative that teachers, parents and peer groups should pay more attention towards their wards and develop in them problem solving skills (Bhat, 2016). According to Skinner (1968), "Problem solving is a process of overcoming difficulties that appear to interfere with the attainment of goal. It is a procedure of making adjustment in spite of interference".

While scanning the related literature Devi (2009) and Hedjazi et al. (2012) found positive relationship between problem solving ability and academic achievement, whereas, Udeanii and Adeymo (2011) showed teachers' problem solving abilities and students learning styles had effect on the student achievement in biology. Besides that Darchingpui (1989) revealed that there were sex differences in achievement in science and problem solving ability and type of school favored achievement in science, and problem solving ability. Higher levels of intelligence (verbal) and field-independence contributed significantly to the total variance on problem-solving ability (Dutt, 1989). While as Macpherson, (2002) explained differences in problem-solving ability related to the year of study and existing academic qualification. Moreover, Salami and Aremu (2006) described problem-solving ability as significantly predictive of study behaviour, and Bandhana and Sharma (2012) found significant impact of emotional intelligence and home environment on problem solving ability.

To sum up, the prior studies related to the variables it reveals that learning styles and cognitive abilities appear to be interactively connected, however, students use of learning styles in reasoning and problem solving ability is unclear.

## **1.2. Current Study**

Prior research has established that all the three variables (learning styles, reasoning ability and problem solving ability) are associated with academic achievement and other cognitive variables. However, not much was known about the joint influence of learning styles in relation to reasoning and problem solving ability. In the current research, the investigator sought to fill the existing gap in the literature by directly examining the learning styles in the context of reasoning and problem solving ability.

## **2. Method**

### **2.1. Participants**

The sample of 598 students of the age group 16-17 years were selected from 18 high schools from the two districts of Jammu and Kashmir (India).

### **2.2. Design and Procedure**

Descriptive survey research was used in the present study. The process of description as employed in this research study goes beyond mere gathering and tabulation of data. It involves an element of population/sampling procedure, tools for collecting the data, interpretation of the meaning or significance of what is described. Thus, description is combined with comparison or contrast involving measurement, classification, interpretation and evaluation. In the present study, inferential statistics was used in deducing results from different statistical techniques employed for investigating the comparison of students reasoning and problem solving with their learning styles.

The data was collected with the help of reasoning and problem solving ability test constructed by the investigator and Kolb's learning style inventory (Kolb, 1999) adapted and standardized by the researcher on a sample of 598 students' at secondary school level through stratified random sampling technique.

#### **2.2.1. Reasoning Ability Test**

The test consisted of 35 items having four alternative responses. The validity of the test was evaluated through face and construct validity. The face validity was evaluated through experts and to evaluate construct validity, the investigator used two methods i.e. Pearson's correlation (score of each dimension & total score of the test), to know the discrimination validity the investigator use two independent samples 't'

test (compare high and low group) and automatic linear modelling showing the contribution of the test. The test has good accuracy and all the values are significant at 0.01 and 0.05 level (Bhat, 2016).

The reliability of the test was evaluated through Cronbach’s alpha having reliability coefficient 0.71.

**2.2.2. Problem Solving Ability Test**

For problem solving ability, the researcher constructed the test consisted of 20 items having four alternatives. The validity was evaluated through experts (face validity) and for construct validity the researcher used two methods i.e. (i) correlation between items and total score of the test (ii) compare high and low group (discrimination validity). The values were significant at 0.05 and 0.01 level. The reliability of the test was calculated through Cronbach’s Alpha Coefficient and it was found to be .729 (Bhat, 2016)

**2.2.3. Learning Style Inventory**

Kolb’s learning style inventory (1999) was used to assess the learning styles of students. It is one of the most well-known and frequently used instruments to assess individual learning style preferences. According to Kolb Individual’s learning styles are like a circle, which contain four learning stages. These stages are: Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC) and Active Experimentation (AE). The process of learning has two main dimensions. First dimension is reaching from abstract conceptualization to concrete experience, and the second is reaching from active experimentation to reflective observation (Kolb, 1984).

The four learning styles, which are based on this learning cycle as identified by Kolb are: Diverger, Assimilator, Converger and Accommodator. The description of Kolb’s Learning Style Inventory is shown in Fig. 1.

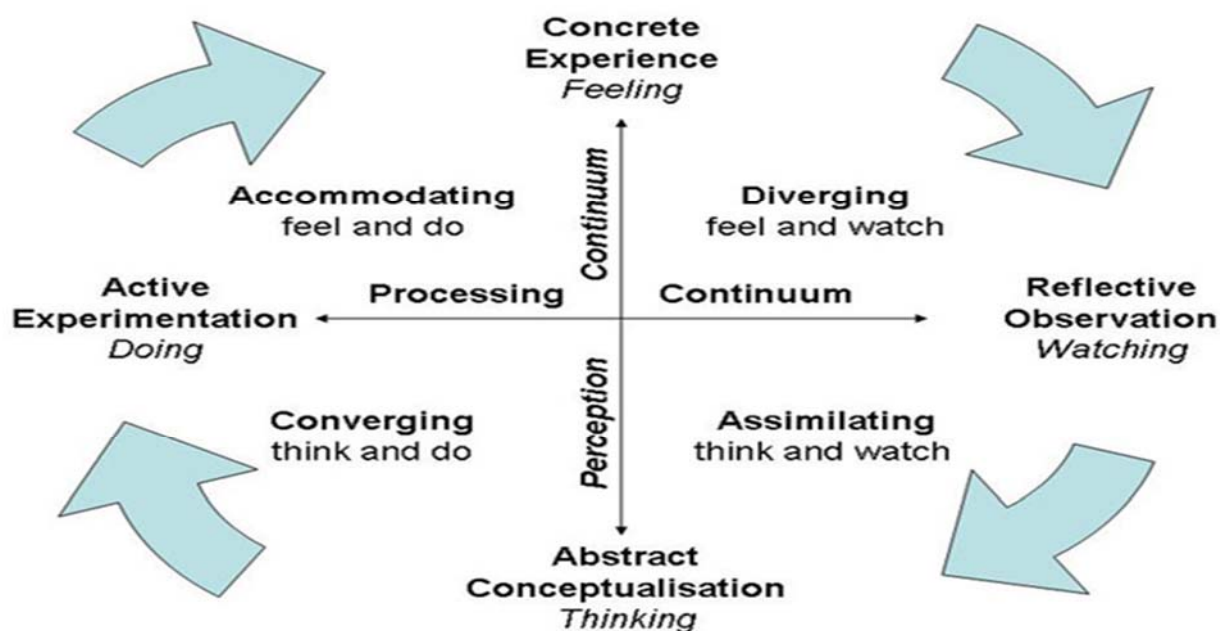


Fig. 1. Graphical Presentation of Kolb’s Learning Style Inventory

The inventory consists of 12 sentences each followed by four statements was used to assess the students learning style preferences. In this inventory students are asked to rank each sentences one to four by expressing their preferences. These preferences are then mapped on the four poles: Concrete experience (CE), Reflective observation (RO), Abstract conceptualization (AC) and Active experimentation (AE). The raw scores of the students ranged from 12 to 48. The degree to which one prefers one’s ability over another is determined by subtracting the scores from (AC-CE) and (AE-RO). The definite learning style of a student is assessed by plotting the scores of AA-CE and AE-RO on a grid. The scores of AE-RO are plotted on

horizontal axis and the scores of AC-CE are plotted on vertical axis to identify the converging, diverging, accommodating and assimilating learning styles (Farooq and Regnier 2011).

The reliability of the inventory has been calculated by number of researchers. Platsidou, (2009) calculated reliability of Kolb's Learning Style Inventory, through Cronbach Alpha for the four learning modes, Concrete Experience (CE) is 0.81, Reflective Observation (RO) is 0.72, Abstract Conceptualization (AC) is 0.76, Active Experimentation (AE) is 0.76 and found them satisfactory.

Askar (1993) adopted it in to Turkish language and calculated reliability by Cronbach's alpha, Concrete Experience (CE) is 0.82, Reflective Observation (RO) is 0.75, Abstract Conceptualization (AC) is 0.81, Active Experimentation (AE) is 0.82, Abstract-Concrete (AC-CE) is 0.81 and Active-Reflective (AE-RO) is 0.78.

Keeping all these attempts in mind the researcher also measured the reliability of the inventory through Cronbach Alpha which is Concrete Experience (CE).676, Reflective Observation (RO).632, Abstract Conceptualization (AC).570 and Active Experimentation (AE).637 (Bhat, 2016).

### 3. Results and Discussions

In order to know the significance of difference between the mean scores of learning styles on students reasoning and problem solving ability, multivariate analysis of variance (MANOVA) was used to describe the directed dependencies of reasoning and problem solving ability on students learning styles. The use of the assessment is based on the assumption that learning styles promote reasoning and problem solving ability. With the multivariate analysis, two dependent variables (reasoning and problem solving ability) were examined across on independent variable (learning styles). Thus, one-way MANOVA was used, to measure how students reasoning and problem solving ability scores (in combination) differ with respect of learning styles (multivariate effect). The MANOVA is useful when dependent variables are moderately correlated (0.4 - 0.7). The correlation between reasoning and problem solving ability is shown in table 1.

**Table 1.** Correlation between reasoning and problem solving ability

Dependent Variables	R	p
Reasoning and problem solving ability	0.556**	0.00

\*\*p < .001

From table 1, the correlation between reasoning and problem solving ability is (0.56) which is within acceptable limit for MANOVA outcomes. As a result, the correlation was not too high of dependent variables; therefore, the investigator precedes the multivariate test.

Besides that, it was necessary to check the Box's Test of Equality of Covariance Matrices. The Box's Test of Equality of Covariance Matrices checks the assumption of homogeneity of covariance across the groups using p < .001 as a criterion. The results are shown in table 2.

**Table 2.** Box's Test of Equality of Covariance Matrices and Wilk's Lambda Test

Independent and Dependent Variables	Box's M	F	p	Wilks' Lambda	F	p
Learning Styles + Reasoning and Problem Solving ability	9.93	1.645	.13	.934	6.85**	.000

\*\*p < .001

From the perusal of table 2 the F value of Box's M =1.645, ( $P>.01$ ) hence, no significant differences on covariance matrices. Therefore, the assumption is not violated and Wilk's Lambda is an appropriate test to use.

The table also displays the results of one-way MANOVA, using the Wilk's Lambda test at alpha level of .01. The values ( $F= 6.85, p < .01$ ) indicate that the test is significant at 0.01 level. The significant F shows significant differences in learning styles on a linear combination of the two dependent variables. It indicates homogeneity of between-group variance for reasoning and problem solving ability scores. Therefore it is concluded that there is a significant multivariate difference for the combined dependent variables of reasoning and problem solving ability with respect to their learning styles.

**Table 3.** Mean difference and univariate analysis of reasoning and problem solving ability according to students learning styles preferences

Dependent Variables	Learning Styles	N	Mean	S.d.	F
Reasoning Ability	Accommodating	168	24.77	4.52	9.034**
	Assimilator	169	27.15	3.48	
	Converging	109	25.26	4.29	
	Diverging	152	26.05	5.18	
Problem Solving Ability	Accommodating	168	10.53	3.02	8.769**
	Assimilator	169	11.75	2.96	
	Converging	109	10.40	2.93	
	Diverging	152	11.75	3.17	

\*\* $p < 0.01$

A perusal of table 3 reveals that students with assimilating learning style possess best reasoning ability, as their mean value is 27.15 is high followed by diverging 26.05, converging 25.26 and accommodating 24.77. Similarly students with assimilating and diverging learning style possess best problem solving ability, as their mean value is 11.75 followed by accommodating 10.53, converging 10.40.

In order to know whether the difference in reasoning and problem solving ability in terms of their learning styles is actual or just by chance, univariate analysis has been used. According to the univariate analysis, the students reasoning, problem solving ability scores significantly differ in terms to their learning styles, because the F values (9.03, 8.77  $p < 0.01$ ) are significant at 0.01 level. The mean difference of learning styles according to their reasoning and problem solving ability has also been represented graphically in figure 2.



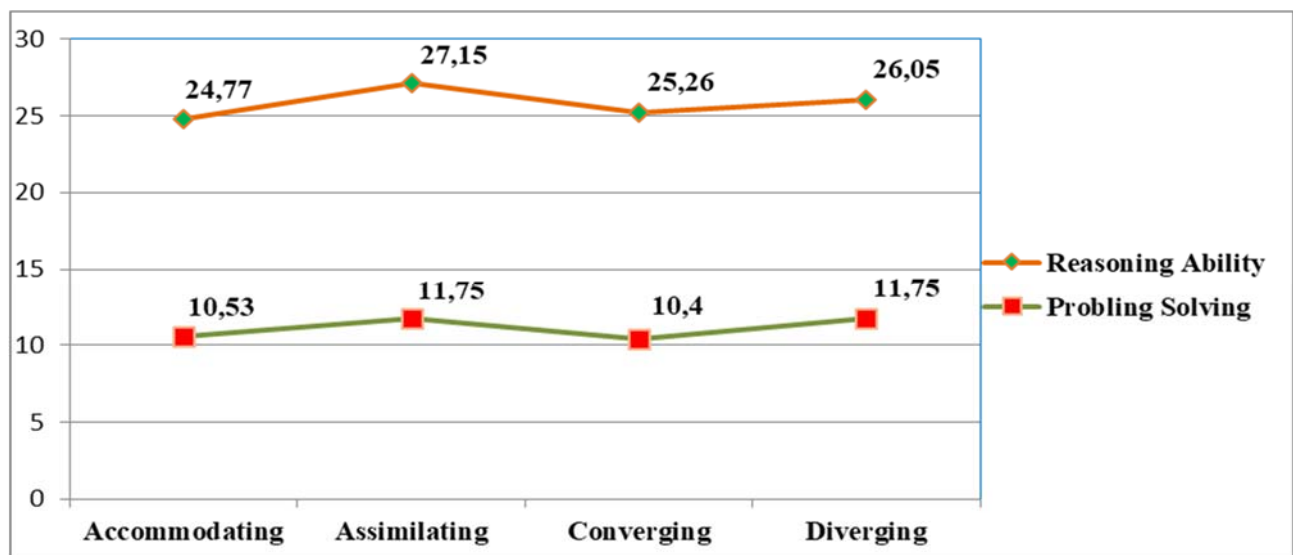


Fig. 2. Graphical presentation of reasoning and problem solving ability means according to students learning style preference

In order to know whether the differences are actual or just by chance within the groups, Scheffe’s post hoc test was used.

Table 4. Multiple comparisons using Scheffe’s Post Hoc Test

Dependent Variable	(I) Learning Styles	(J) Learning Styles	Mean Difference (I-J)	p
Reasoning Ability	Accommodating	Assimilating	-2.37*	.000
	Converging	Assimilating	-1.89*	.003
Problem Solving Ability	Accommodating	Assimilating	-1.22*	.001
	Converging	Diverging	-1.35*	.002
Problem Solving Ability	Assimilating	Converging	1.35*	.002
	Converging	Diverging	-1.35*	.002

\*\*p < 0.05

The table 4 reveals that there is significant difference between accommodating and assimilating, converging and assimilating learning styles so far as reasoning ability is concerned. Similarly a significant difference between accommodating and assimilating, accommodating and diverging, assimilating and converging and converging and diverging so far as problem ability is concerned.

From the results, it indicates that learning styles make the difference with regard to students reasoning and problem solving ability, besides students having assimilating and diverging learning styles possess better reasoning and problem solving abilities. The students who receive and process information through assimilating learning style, prefer abstract conceptualization (AC) and reflective observation (RO). The learners who prefer to such type of learning style tend to have an inductive reasoning and capability to build theoretical models. They have disparate observations into an integrated explanation and are less focused on people and more concerned with ideas and abstract concepts. Their ideas are judged less by their practical values. They have the most cognitive approach, preferring to think than to perform and prefer instructional

methods for their learning. In addition they can understand a wider range of information, which they are capable to coordinate into concise and logical form (Kolb, 1984).

Moreover, assimilating learning style replicates trait of basic mathematics and sciences. Students are motivated to answer the query, 'what is there to know' (Litzinger and Osif, 1993). They focus on abstract concept and thoughts while they learn something. These people prefer to become teacher, sociologist, educationist, advocate, law, librarian etc.

The students who have diverging learning styles learn through feeling and watching. Divergent knowledge is more about creativity. It is about the generation of a number of accounts of experience. According to Kolb (1984) the learners who desire to learn through diverging learning style possess strong imaginative ability, awareness of meaning and values. They do their best in situations that call for generation of alternative ideas and implications such as brain storming, view concrete situations from many perspectives. They organize many relationships into a meaningful "gestalt". Besides that they emphasize on observation rather than action, interested in people and tend to be imaginative and feeling oriented and has broad cultural interests. This type of learning style is a combination of concrete experience (CE) and reflective observation (RO) learning styles. Individuals who own this learning style like to look at things from many perspectives and are very open-minded and prefer to work with people. Generally, other people can easily influence and to get constructive feedback is important for them. Their judgments about any situation are taken very patiently and carefully but they don't like to involve in action. These people choose jobs such as social practices, journalism, psychology, literature and art/theatre (Kolb, 1984).

#### 4. Conclusions and Implications

From the results of the study it has been found that while using different learning styles the students show variations in reasoning and problem solving abilities. Moreover, students having assimilating and diverging learning styles possess better reasoning and problem solving abilities. It is worth to mention that assimilating and diverging learning styles promote reasoning and problem solving abilities. The identification of student learning style helps a student to become an efficient problem solver. The more successful the individual is at solving the problems, the more control one will have over their life. Students should be provided opportunities to receive education in areas suitable for their learning styles. A person educated in an area having no relationship to his learning style may lack confidence, and may result in delayed success.

Therefore, it is emphasized that teachers and students should be familiar of learning styles. They may try to identify their own learning styles. Thus, recognizing students' learning styles may enable teachers to organize their instructions according to their students' individual needs and facilitates their learning. Besides, teaching according to students learning styles may assist students to become more eager about the subject, investigate and understand the facts and most essentially they put into practice what they have learned.

In this paper, Kolb's experiential learning model has been used. It helps students to understand learning and shows flexibility at a deeper and more comprehensive level. The theory also provides practical guidance aimed at helping students to improve their learning and to design better education and development.

The teachers may use various learning style instruments to determine learning styles of their students at the beginning of the academic year. Thus, they may organize instructional strategies according to learning style preferences by their students. Also, in-service teacher training programs may be organized to update teachers about students' learning styles and teaching methods, which are based on students learning styles.

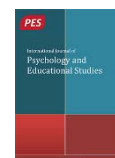
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## Canonical Analysis of the Association Between Attention-Deficit/Hyperactivity Disorder with Some Psychological Problems Among Students

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### ABSTRACT

This study aimed to investigate the relationship between ADHD with internet addiction, depression, anxiety, stress and social phobia. The study was a descriptive-correlation study. Statistical Population of the study was females' students from Kosar university of Bojnord and, among which 327 students were selected by random sampling method. Participants completed ADHD Self-report Questionnaire (ASRS), Internet Addiction Test (IAT), Depression, Anxiety and Stress Scale (Das 21), and Social Phobia Inventory (SPIN). Data were analyzed by applying Pearson correlation coefficient and canonical correlation analysis statistical tests and SPSS version 23. Pearson correlation's results showed that ADHD components (attention deficit and hyperactivity impulsivity) had positive significant relationships with internet addiction, depression, anxiety, stress and social phobia ( $p < 0.01$ ). In addition, canonical correlation results indicated there were significant relationships between attention deficit and internet addiction, depression, stress and social phobia and also hyperactivity/impulsivity and internet addiction, depression, anxiety and stress. However, there was no significant relationship between attention deficit and anxiety, and hyperactivity/impulsivity and social phobia ( $p > 0.05$ ). ADHD related to many psychological disorders. So it seems to screen students with the disorder and designing some treatment interventions for these students to decrease negative consequences are required.

#### Keywords:

attention deficit/hyperactivity, internet addiction, depression, stress, social anxiety

### 1. Introduction

Attention deficit hyperactivity disorder (ADHD) most often diagnosed in childhood, but in some cases, the symptoms may persist from childhood to adulthood. ADHD is a neurodevelopmental disorder that is mostly diagnosed in childhood. This symptom includes inattention, hyperactivity and impulsivity, and disorganization, which negatively affects the performance abilities and accomplishment of individual and social duties and tasks (Kessler, Chiu, Demler, Merikangas, & Walters, 2005; Miller, Ho, & Hinshaw, 2014; Mosalanejad, Mosalanejad, & Lashkarpour, 2013). Perhaps, in half of the children with ADHD symptoms, this disorder appears in adulthood (Ivanov & Yehuda, 2014; Klein et al., 2012). ADHD occurs in 3-7% of school-age children and 4% of adults (Faraone & Antshe, 2008; Kavakci, Kugu, Semiz, Meydan, Karsikaya, & Dogan, 2012).

ADHD symptoms in adults may vary from children. Adults with this disorder are more likely than their peers to have low levels of social adjustment, difficulty in time management, poor communication skills and interpersonal skills, attention deficit disorder, executive action, impulsivity, emotional and psychological

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problems, drug abuse and drinking alcohol, of education and work challenges (Bakhshani, Raghobi, & Babaei, 2011; Green & Rabiner, 2016). College students with hyperactivity symptoms experience depression and educational problems during their education (Rabiner, Anastopoulos, Costello, Hoyle, & Swartzwelder, 2008).

ADHD is also associated with other abnormalities, including Internet addiction (Bozkurt, Coskun, Ayaydin, Adak, & Zoroglu, 2013; Cao, Su, Liu, & Gao, 2007; Chou, Huang, Chang, Chen, Hu, & Yen, 2017; Yen, Ko, Yen, Chen, & Chen, 2009). Cross-cultural studies have shown that Internet addiction is associated with psychiatric disorders such as mood and anxiety disorders (including generalized anxiety disorder and social phobia disorder), and ADHD (Floros, Siomos, Stogiannidou, Giouzepas, & Garyfallos, 2014). Bozkurt, Cascan, Aydaydin & Zoruglo (2013) believe ADHD is one of the most common psychiatric disorders among adolescents with Internet addiction. There is another evidence that extreme use of the Internet is associated with problems such as depression, insomnia, attention deficit, hyperactivity disorder and social anxiety (Cheung & Wong, 2011; Ho et al., 2014; Morrison & Gore, 2010). Moreover, adolescents who spent most of their time on computer games reported more hyperactivity symptoms (Yoo, Cho, Ha, Yune, Kim, Hwang, Chung, Sung, & Lyoo, 2004). Another conducted study in Taiwan on university students also found that hyperactivity disorder was associated with addiction to the Internet, especially it was more significant among female students (Yen, Ko, Yen, Chen, & Chen, 2009).

A high percentage of psychiatric disorders in any age group belongs to individuals with ADHD. In adults, 65-89% suffer from one or more disorders, including mood disorders and anxiety, drug abuse and personality disorders, which in fact complicate the diagnosis, treatment and outcome of the clinical pattern (Sobanski, 2006). Nelson and Lieble (2017) in their study found that college students who are identified as ADHD significantly reported higher anxiety and depressive symptoms than those who are without ADHD. Some studies also have reported that compared to male students, female students with ADHD reported significant rate of anxiety and depressive symptoms (Fuller-Thomson, Lewise, & Agbeyaka, 2016). Parvareh, Ziaol dini, Erfani & Shokuhi (2014) in their study found that there is a significant relationship between ADHD and depression in adulthood and it is one of the first symptoms of ADHD in adulthood. ADHD also significantly increases the risk of adjustment disorders, conduct disorders, oppositional-defiant disorders, mood, anxiety, personality disorders, and drug abuse (Yoshimasu, 2012).

O'Rourke, Bray, and Anastopoulos (2017) noted that most likely college students with ADHD have a background of anxiety disorders and may encounter a greater risk of anxiety symptoms and other related problems. In addition, researches showed that the most comorbid disorders related to ADHD that was assessed in a sample of 129 patients were major depressive disorder (53.8%), social phobia (35.5%), and GAD (23.1%) (Mörtberg, Tilfors, & Bejerot, 2012; Van Ameringen, Mancini, Simpson, & Patterson, 2010). What is more, research regarding the ADHD associated with stress showed that adults with ADHD, physiologically, has shown higher stress responses and elevated level of subjective stress when they compared with those who are not diagnosed with ADHD (Hirvikosi, Lindholm, Nordenstrom, Nordestrom, & Lajic, 2009), and ADHD symptoms positively related to perceived stress (Combs, Canu, Borman-Folks, Rocheleau, & Nieman, 2015).

The literature review indicated the comorbidity of ADHD with some aforementioned psychological problems. As it was discussed, university students with ADHD might be at risk of encountering many challenges during their studies, their social life and adaptation to the university.

Therefore, this study focused on exploring the relationship between ADHD with Internet addiction, depression, anxiety, and stress and social phobia.

## **2. Method**

This research was a descriptive-correlational study regarding the method of data collection.

### **2.1. Population and Sampling Method**

The statistical population of the study were all students of Kosar University of Bonord (in the east of Iran). The sample size was 327 students that were chosen according to Krejcie & Morgan Table from students of different majors by random cluster sampling method. The method was that in the beginning, different faculties were considered as a cluster; then the majors of the faculty and after that, students of their majors were taken.

Due to study ethic, the sample members' identity was kept confidential and they were asked to fill a questionnaire. Data were analyzed by Pearson correlation test and Canonical correlation in SPSS software. Data collection tools are as follows.

## 2.2. Data Collection Tools

### 2.2.1. Adult ADHD Self-Report Scale (ASRS)

This questionnaire was constructed by Kessler et al. (2005) and consists of 18 items and two parts; the first part (6 questions) is used to screen adult ADHD. The scoring method is Likert scale and it is graded from never to very often. The questionnaire has a sensitivity of 68.7% and a kappa coefficient of 0.76. Adler, Spencer, Faraone, Kessler, Howes, Biederman, and Secnik (2006) reported high internal consistency and high concurrent validity of the questionnaire. Mokhtari, Rabiei and Salimi (2015) in Iran, also reported its correlation with the Conner's ADHD questionnaire, which is 0.67, and its validity has been obtained using confirmatory factor analysis method.

### 2.2.2. Young's Internet Addiction Test (IAT)

In the Internet addiction test, the reader should answer each of the 20 questions on the 5-point scale ranging from rarely to always. The scores range from 0 to 100 in this test, which indicates a greater degree of dependency on the Internet and the severity of the problems caused by excessive use. Widyanto & McMurrin (2004) reported moderate to the good internal consistency of this scale, which Cronbach's alpha coefficients ranging from 0.54 to. They also reported good internal consistency and concurrent scale validity. Alavi et al. (2011) reported the Cronbach's alpha coefficient for the whole questionnaire to be 0.80.

### 2.2.3. Depression, Anxiety and Stress Questionnaire (DAS-21)

The questionnaire was developed by Levi bond and Levi bond (1995) and includes a set of three self-evaluation subscales that are used to measure negative emotional states of depression, anxiety and stress. Each subscale has 7 items. Levi bond and Levi bond [1995] performed a questionnaire in a non-clinical sample and reported Cronbach's alpha coefficients for three subscales of depression, anxiety and stress, respectively 0.91, 0.84 and 0.90. Antony, Bieling, Cox, Enns, & Swinson, (1998) analyzed the questionnaire, whose results showed that there were three subscales. The questionnaire validity was also obtained by convergent and discriminant validity (Asghari, Saed, & Dibajian, 2008).

### 2.2.4. Social Phobia Inventory (SPIN)

This questionnaire was developed by Conner et al. (2000) to assess fear or social anxiety. This scale has 17 items that are graded according to the 5-point Likert scale (not at all to extremely). The reliability coefficient of this questionnaire was tested by a test-retest method in social phobia disorder groups ranging from 0.78 to 0.89, and the reliability coefficient was reported by the Cronbach's alpha in normal individuals for the total scale of 0.94. Both convergent validity and divergent validity were established by comparing the SPIN and other adult assessment scale of social phobia or anxiety (Connor, Davidson, Churchill, Sherwood, Foa, & Weisler, 2000). In Iran, Hasanvand Amuzadeh (2016) has an internal consistency of 0.82 in the first half and 0.86 in the second half of the test, and a correlation between two half-tests 0.76 and Spearman Brown's correlation coefficient of 0.91. The internal consistency of the subscales of fear, avoidance and physiological discomfort was 0.74, 0.75 and 0.75, respectively.

## 3. Results

In this study, the average age of the students was  $19.97 \pm 2.8$ , of which 75.7% were single and 24.3% were married, and 35.9% were native and 64.1% were from other cities. Moreover, the prevalence of ADHD among students was 17.4% (57 people). The descriptive statistics of Internet addiction, depression, anxiety, stress, social phobia, and hyperactivity (attention deficit and hyperactivity / impulsivity) are also presented in Table 1.



**Table 1.** Descriptive Statistics of Internet addiction: depression, anxiety, stress, social phobia and hyperactivity

Variables		Mean	Standard deviation	Minimum	Maximum	Kurtosis	Skewness
Dependent variables	Internet addiction	85.59	11.74	4.4	100	0.89	-1.07
	Depression	17.31	3.19	7	21	0.64	-1.01
	Anxiety	17.70	2.78	9	21	0.32	-0.92
	Stress	16.36	3.04	7	21	-0.17	-0.54
	Social phobia	68.69	11.92	30	85	0.42	-0.94
Independent variables	Attention deficit	31.21	5.82	16	45	-0.32	-0.04
	Hyperactivity/impulsivity	33.15	5.62	17	45	-0.08	-0.22

To study the normality of the research variables, given the sample size is more than 100, the statistics of Kurtosis and Skew were used. As shown in Table 1, the Kurtosis and Skew indices of the variables are between -2 and 2, indicating the normal distribution can fit the data. Internet addiction has the highest average and stress has the least amount among the research variables. The Pearson correlation method was used to investigate the relationship between the variables. The results of the correlation matrix between the research variables (ADHD, internet addiction, depression, anxiety, stress and social phobia) are shown in Table 2.

**Table 2.** Correlation matrix of research variables

Variable	Attention deficit	Impulsivity	Internet addiction	Depression	Anxiety	Stress	Social phobia
Attention deficit	-						
Hyperactivity/Impulsivity	0.64*	-					
Internet addiction	0.33*	0.34*	-				
Depression	0.29*	0.29*	0.21*	-			
Anxiety	0.26*	0.29*	0.37*	0.61*	-		
Stress	0.41*	0.46*	0.27*	0.70*	0.61*	-	
Social phobia	0.27*	0.26*	0.16*	0.46*	0.44*	0.43*	-

\*Correlation is significant at the 0.01 level (2-tailed)

As it is shown in Table 2, there is a significant positive relationship in the significance level of 0.01 between the ADHD variable (attention deficit and hyperactivity/impulsivity) and internet addiction ( $r=0.33$ ,  $r=0.34$ ), depression ( $r=0.29$ ,  $r=0.29$ ), anxiety ( $r=0.26$ ,  $r=0.29$ ), stress ( $r=0.41$ ,  $r=0.46$ ) and social phobia ( $r=0.2$ ,  $r=0.26$ ) ( $p < 0.01$ ).

Given that in this research, the number of dependent variables is more than one variable (Internet addiction, depression, anxiety, stress and social phobia), therefore, canonical correlation analysis is utilized to investigate the relationship between ADHD (attention deficit and hyperactivity/impulsivity) with a set of variables, including Internet addiction, depression, anxiety, stress and social phobia. The canonical correlation is the generalized form of multivariable regression that adds more than one dependent variable to the predictive equation [30]. Table 3 shows the results of the canonical correlation between ADHD with the set of criteria variables.

**Table 3.** Results of canonical correlation between predictor and criteria variables

Independent Var.		Value	F	p	Partial Eta Squared	Observed Power
Attention deficit	Wilkz L.	0.94	2.94	0.013	0.05	0.84
Impulsivity	Wilkz L.	0.89	5.45	0.000	0.10	0.99

The results of Table 3 reveal that the variables of attention deficit and impulsivity have a significant relationship with the set of variables Internet addiction, depression, anxiety, stress and social phobia ( $p < 0.05$ ). Also, the results of canonical correlation between each of the criteria and predictive variables are shown in Table 4.

**Table 4.** Canonical correlation results between each of the criteria and predictor variables

Independent var.	Dependent var.	df	Mean Square	F	p	Partial Eta Squared	Observed Power
	Internet addiction	1	730.373	6.099	.014	0.02	.691
Attention deficit	Depression	1	44.242	4.788	.030	0.01	.587
	Anxiety	1	20.451	2.895	.090	0.01	.396
	Stress	1	56.433	7.929	.005	0.03	.801
	Social phobia	1	646.320	4.940	.027	0.02	.600
	Internet addiction	1	990.387	8.271	.004	0.03	.817
Hyperactivity/impulsivity	Depression	1	49.032	5.306	.022	0.02	.631
	Anxiety	1	47.281	6.693	.010	0.02	.731
	Stress	1	146.738	20.617	.000	0.07	.995
	Social phobia	1	459.513	3.512	.062	0.01	.463

According to Table 4, there is a significant relationship between attention deficit disorder with Internet addiction ( $P=0.01$ ), depression ( $P=0.03$ ), stress ( $P=0.005$ ) and social phobia ( $P=0.02$ ) ( $p < 0.05$ ). Hyperactivity/impulsivity also has a significant relationship with Internet addiction ( $P=0.004$ ), depression ( $P=0.02$ ), anxiety ( $P=0.01$ ) and stress ( $P=0.000$ ) ( $p < 0.05$ ), but there is no significant relationship between anxiety ( $P=0.09$ ) and impulsivity with social phobia ( $P=0.06$ ) ( $P > 0.05$ ).

#### 4. Discussion and Conclusion

The purpose of this study was to determine the relationship between ADHD and some psychological disorders on female students in Kosar University. The results showed a significant positive relationship between hyperactivity and internet addiction. This conclusion is consistent with the findings of Yen et al. (2009), Yu et al. (2004), Cao et al. (2007), Bozcourt et al. (2013). In fact, the Internet has some attractions that may improve focus and performance, and compensate for defects such as attention problems and poor performance. As a result, abnormal brain activity in individuals with ADHD may be associated with inhibition in online activities, and this limitation of self-control of students makes it impossible to control the use of the Internet. Additionally, people with ADHD experience problems in social communication and social responses that may create negative emotions in their peers, leading to isolation and exclusion. As a result, the Internet can be a

substitute for communication and social support (Sacchetti & Lefler, 2014; Humphreys, Galán, Tottenham, & Lee, 2016).

In addition, the results showed that there is a positive and significant relationship between ADHD with other psychological problems, such as depression, anxiety, stress and social phobia. These results are consistent with the findings of Sobansky (2006), Sobansky et al. (2007), Parvaresh et al. (2014), Yoshimasu et al. (2012), Koyuncu, Celebi, Ertekin, Kok, & Tukul (2016). Hirvikosi et al. (2009), Combs et al. (2015), and O'Rourke et al. (2017).

Findings show that students with hyperactivity symptoms experience more psychological and emotional problems than other students. This means that students with ADHD report lower levels of social adjustment, social skills and self-esteem, and have depression scores higher than their peers. In the findings of Bridman et al. (2002), women with ADHD reported high levels of depression. According to the findings, there is also a high risk of relationship between ADHD and anxiety. Ruth et al. (2004) in a study of 28 hyperactivity/attention deficit disorders of adults and their comparison with the control group, found that in these adults, memory loss is due to situational anxiety of doing a task rather than weakness in active memory or reduced semantic organization. Therefore, one of the causes of anxiety in this disorder is a fear that is associated with a lack of social or cognitive functions, and this fear can be an appropriate response to these deficiencies. Furthermore, people's anxiety is due to the fact that they experience more disabilities in their everyday lives, and their anxiety is due to a feeling of inadequacy in performing social and cognitive assignments. Koyonech et al. (2016) also agree with the findings that people with ADHD may show maladaptive coping behaviors in the community due to signs of the disorder that may not be understood and have negative consequences such as criticism, insult, humiliation and even violence. As a result, these people experience social phobia, which leads to a cognitive deterioration toward society, and these inhibitions continue to persuade social phobia and isolate the individual.

The results of this study have gained useful information about ADHD adulthood with some psychological disorders, but only on female students, which may limit the generalizability of the results of this research to male students. Therefore, in future studies, considering the role of gender as a moderator variable seems to be necessary. The use of self-report tools is another study limit that may lead participants in this research to choose the answers that tend to gain social approval. Therefore, the use of additional tools such as observing behavior and interviewing can increase the validity of the results. To conclude, given the relationship between ADHD with many psychological problems, students with this disorder are more likely to be inferior to normal students in terms of communicative, social, educational, and other functions. Therefore, it is necessary to do students screening to use beneficial interventions and therapies in order to reduce the negative psychological and social consequences.

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## Cybertherapogy: A Conceptual Architecting of Presence for Counselling via Technology

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### ABSTRACT

The growing urge for mental health via telecommunication systems argues for such services to be discussed at the field of human-computer interaction. However, in spite of the research and evidence that express effectivity of telecounselling, details about the transition to computer-mediated environment are still uncharted. "Cybertherapogy" was coined in this regard to build a schema for engaging and creating meaningful therapy experiences during remote sessions. The model labels strategies that mental health providers should include in their services. Cognitive, counselling, and emotional modules were intersected and overlapped to construct the domains of therapeutic presence in cyberspace. This architecture of emotional agency has been synthesised for psychotherapy by the ongoing concepts and theoretical foundations of present study and electronic learning engagement. It is believed that the model will enable therapists to facilitate their remote, professional engagement with clients and help design administrative tactics for adequate therapy services.

#### Keywords:

telepresence; therapeutic presence; cyberpsychology; telecounselling; emotional agency; virtual reality

### 1.Introduction

A strong healthcare service begins with a strong multi-dimensional experience of interaction between doctor and patient. It is argued that genuine healing responsiveness is provided by securing the sense of "being willing and intent on approaching and connecting to the present moment of clients, with open readiness to receive what is there without prejudice or expectation" (Geller, Pos, & Colosimo, 2012, p. 9). This sense which is called therapeutic presence is initiated in face-to-face sessions by observing the clients, seeing their bodily reactions, listening to their mental problems and responding in a therapeutic manner (Geller & Greenberg, 2012, p. 59). However, such preliminary conditions for an effective therapeutic presence can be impaired during computer-mediated communication (CMC). Behavioural and non-verbal cues which are important for therapy purposes are reported with the reduction in technology-based communication or CMC might not be simultaneous (Walther, 2011; Walther & Tidwell, 1995). For instance, text messaging is being offered by providers as a successful mode of delivery for mental health care that lacks physical presence, and unlike in office sessions, can build an asynchronous connection (see, for example, Pelling, 2009; Robinson & Serfaty, 2008). Meanwhile, the presence of users is less embodied in cyberspace and thus a shear informational interaction with a partner cannot guarantee on itself a unified sense of therapeutic presence (Tu & McIsaac, 2002). Thereby it seems to be explainable that responsiveness if defined in association with the presence of counsellors including psychotherapists might not be assured when telecommunication technologies are used.

\*These terms will be used interchangeably. However, cybertherapy will be employed specifically when healing is at the core of the e-counselling practice.

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Even so with this initial induction, there are no attempts, to the best of the author's knowledge, which has explored therapeutic presence as a concept when mental health service is provided via technology (Alvandi, van Doorn & Symmon, 2017a). Reserving experimental requirements as future loadings, the current study aims to define how e-counselling / cybertherapy presence could be conducted in a technology-based environment. The following suggests a framework and discuss the dimensions for this purpose.

### 1.1. Cybertherapogy: A Model for Counselling Presence

There is no universally agreed upon definition of therapeutic presence when is employed in digital healthcare. Hence, consistency in a visible presence is established by exploring the intangible presence elements for which the similarity of servicing environment of health care with other activities postulates the ongoing model. (Miclea, Miclea, Ciuca, & Budau, 2010). On the basis of some e-learning models such as the Inquiry Model of CMC (Garrison, Anderson, & Archer, 1999) or the Cybergogy for Engaged Learning Model (Wang & Kang, 2006), we can establish how the servicing nature of e-counselling (including e-mental health) looks similar to e-learning purposes. Initially, it is regarded that e-counselling servicing targets consultation or psychotherapy by distance as like as e-learning which was aimed for the accessible online education. In other words, online counselling environment and online teaching classes have almost the same informational nature of communication and both services look after remote therapeutic and learning outcomes, respectively. The second syllogism is suggested by e-learning programs that seek to ease the educational communication between teachers and learners. As such, e-counselling programs wish to provide effective therapeutic interventions between counsellors and clients.

The similarities are striking but they are not enough to lay out the structure of e-counselling. To build a conceptual model that better describes therapeutic presence for e-mental health there is another substantial analogy that relates to the ways the tasks and methods of e-learning and e-counselling are performed. E-learning literature suggests that teaching capability during telepresence should be provided by teachers' rendered skills. In the similar way counsellors who use meditated environments or assistant automated therapists have to represent counselling capabilities. Specifically, employing the knowledge from relational dyad of teaching-learning can assist us in resembling the interactive communication and relational dyad of treatment-recovery between online pairs of counselling.

However, several factors have to be elucidated when a dyadic interaction between CMC pairs is sought. On the one hand, visibility is discussed the main admitting level of presence (Wang & Kang, 2006). This level is discussed in e-learning a key that associates with the visibility of teaching pairs or sensibility of their actions, which, in turn, is urged more in mental health care. However, visibility is not granted if an online environment (including Virtual Reality) does not provide comprehensive levels through which the community in learning and teaching engage with each other (Ijsselsteijn, 2002). It is said that visibility is not a simple measure that can warranty a meaningful interaction. Highlighting its role, a union of cognitive, social, and emotive levels is supposed to realize and qualify online learning more engaged. Research has reportedly supported the importance of this implemented levels for online interaction, social networking, and has confirmed the accuracy and efficacy of the hypothesized causal relationships among online presence and learning (For more detail see: Garrison et al., 1999; Kang, Kim, & Kang, 2008; Kang, Kim, Choi, & Park, 2007; Kang, Kim, & Park, 2007; Shea & Bidjerano, 2009).

Likewise, e-counselling or cybertherapy sessions need to operate modulated therapeutic presence to cultivate clients' problems and detect their mental disorder. This is argued because the correlation of visibility and therapy process is granted as the significant level of therapeutic occurrence in a computer-mediated environment (CME). In addition to this, computer-mediated sessions should desire effective therapeutic responsiveness by engaging users of CME to understand the spirituality of their communication; this understanding will not be achieved if not be similar to an in-person counselling session that is sought by emotional and cognitive engagement with clients (Geller & Greenberg, 2002, 2012; Geller, Greenberg, & Watson, 2010; Robbins, 1997). Reserving these assumptions, the domains of the modules that are thought to engage therapists-clients together through CME are explored below (See Figure 1).



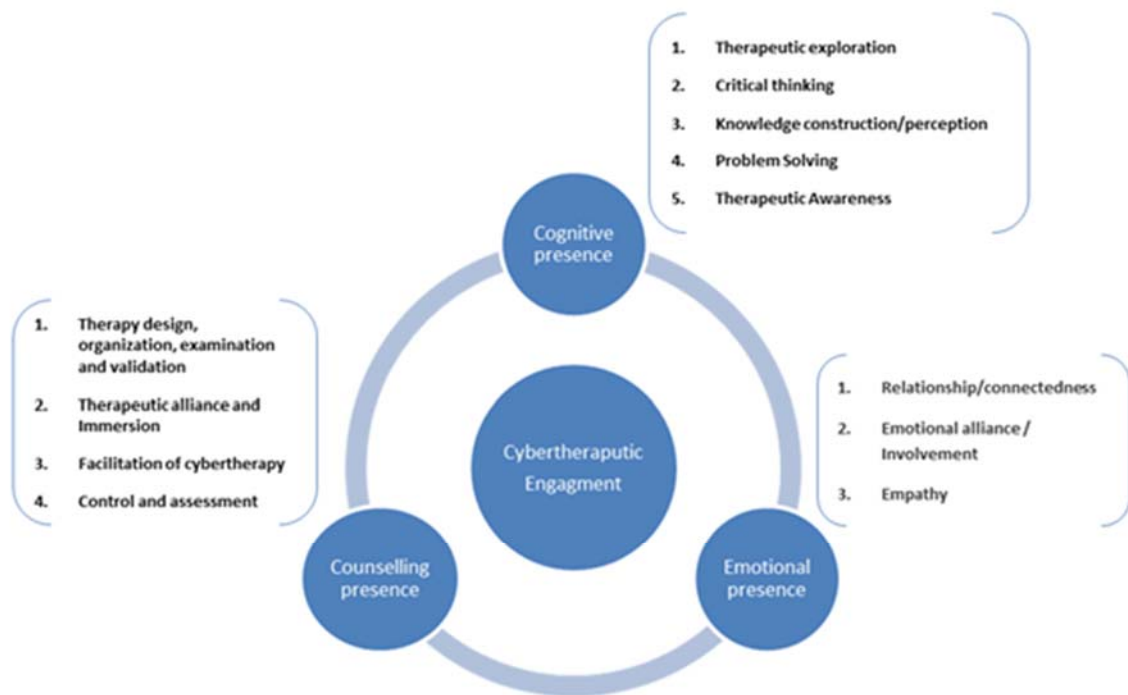


Figure 1. Cybertherapy: Modules of Therapeutic Presence via Technology

## 1.2. Cognitive Module Of Counselling Presence

The physical interaction per se does not guarantee clients and counsellors be engaged in consultation or psychotherapy with a meaningful manner and high level of understanding. Meaningful therapeutic interaction is a by-product of cognition that comes out as an inherent junction to bind both perceptual and cognitive actions of interactivity (Fodor, 1983). In this spirit, cognitive module of presence is proposed the first to achieve a sound interactivity in terms of e-counselling / cybertherapy (Figure 1). It is interpreted as the degree to which CME dominates over the real environment as the basis for therapeutic thought (Nunez & Blake, 2001). In other words, interactivity in CME would be sound whenever interactors understand and perceive each other mutually, judge and also reason about communicated objectives with remarkable satisfaction. However, it is necessary to justify (1) what cognitive module provides for therapeutic presence and (2) how the module is presented during cybertherapy session.

In regard to the first inquiry, cognitive presence constructs typically a body of knowledge for e-counselling / cybertherapy provider that is regarded as practical rational inquiry (Garrison, Anderson & Archer, 1999). This rational inquiry demonstrates critical thinking that provides counselling interactants a meaning construction channel per a sustained and intimated (healing) communication (Cobb, 2009). In other words, while cognitive presence is pinned to counselling process, counsellors can critically explore what CME offers to the intervention. They also can interpret the digital communication and expect what communicated verbal and nonverbal cues carry towards therapeutic aims. Therefore, the module enables the counsellors to end up with one or hybrid effective counselling methods to be employed and assists them in monitoring the outputs to reach a logically certain, positive conclusion.

Regarding the second inquiry, cognitive module of presence is practiced by utilizing communication skills (Kreijns, Kirschner, Jochems, & Van Buuren, 2011) and is experienced via perceptual motor loop (Ijsselstein, 2002; Nunez, 2007). That says, multisensory and conceptual apparatus involved in communication builds action-based perception, focused attention/awareness, and the integration of reasoning and problem-solving. However, we wish to stress that - recognizing psychological problem and providing consultation / therapy from only embodied cues can lack a cognitive component because body movements or facial expressions of

clients produce only body state information of affects or mental disorders, but nothing more about the meaning of the action or behaviours in clients. Therefore, bodily information can be a dependent variable to investigate the cognition of mental states such as emotions (Zhang, Yu, & Barrett, 2014), but cannot be considered independent variable in cybertherapy conditions as pertain to be inhibited for many reasons (e.g. less therapeutic alliance, disrupted cyber interventions). Also, nonverbal cues that are reduced or blurred through computer-mediated delivery conditions need to be exposed by virtue of elaborated cognitive capacity to avoid any interference with remote environment and therapeutic tasks. Therefore, any facts and ideas transmitted in online therapy session stands on the experience of communicated concepts, taken actions and deliberations, rather than relying on the expressed bodily cues (Kanuka & Garrison, 2004).

Presenting cognitive module of presence, however, should be propounded with a procedural way of practicing. Based on an analogy drawn from e-learning studies, the cognitive module could be identified with four phases in counselling / cybertherapeutic inquiry process (Garrison, Cleveland-Innes, & Fung, 2010) (see figure 1). The exploration phase is the first phase that can define what is a problem or task. The second is the critical thinking phase that explores relevant information/knowledge over the problem or disorders. In the third phase that is called knowledge construction, ideas for the practice are integrated and (healing concepts are clarified; and, finally, during the problem-solving phase, plausible methods, supports or cares are designed and practiced consciously by online counsellors / cybertherapists.

These phases, according to Wang and Kang (2006), will largely be aligned by following the information level of therapeutic interaction. These stages are introduced for this purpose. In information acquisition stage, current/prior knowledge of personal and social states are assessed to find useful information for the counselling question. Counselling pairs in this stage explore their situations and then integrate the information to give an appropriate organizational reflection (Kanuka & Garrison, 2004). In information transformation stage, relevant and appropriate information of intervention (e.g. history of mental disorders and possible supports) are communicated between parties to direct consultation towards a figured goal. Collaboration, management and engagement are phased between counselling pairs over this stage. The stage of counselling knowledge construction is the third one that coaches counsellors and clients to improve and optimize their therapeutic alliance and requirements (Martin, Garske, & Davis, 2000). This stage of cognitive development conceptualizes therapeutic information so that mental problems and troublesome situations can be perceived and monitored appropriately (Kanuka & Garrison, 2004). The therapists who acquire such constructive knowledge of therapy could, in turn, enhance their controlling capability of therapy process. They can judge about their reflection to emotional experiences of clients and assess the accuracy of consultation. This stage also informs about the actions that can be taken to cover new mental problems, the similar therapeutic context and new circumstances of communication.

Beyond the sensory motors and informational stages, exchange of empathic information is proposed the fourth stage to the information level of cognitive presence (Hayes & Vinca, 2011). Psychotherapy literature suggests an empathetic relationship between client and therapist a salient factor of therapy. Here, cognitive empathy turns into a key matter since that can assist in therapeutic reasoning. In other words, cognitive empathy is a component of the cognitive module that involves an intellectual comprehension of clients' inquiry or mental disorders. This empathy also weights inferring ability of counsellors by enabling them to diagnose psychological states of clients and adopt the remedial perspectives (see for review: Davis, 1996). However, this analytical ability overlaps with the level of awareness in counsellors. According to Hoffman (1984), counsellors will emphasize authoritatively with clients when they are capable to recognize concurrently one's self and client's selves. They should also be skilful in differentiating one's own and client's emotional states consciously; otherwise those of counsellors who empathize unconsciously with clients may not understand the thoughts and feelings of clients and that may end with difficulty in therapeutic process (Baron-Cohen & Wheelwright, 2004).

### 1.3. Counselling Module Of Presence

Counselling presence has a strong association with the professional skills of care providers. Literature review introduces, for example, nursing presence an important factor for qualitative nursing care services (Doona, Haggerty, & Chase, 1997; Melnechenko, 2003; Minicucci, 1997). Easter (2000) highlights the nursing a key mode

to provide care for the sick as long as a nurse is present to a patient in an authentic professional relationship. It is also the similar thought in the work by Finfgeld-Connett (2005). He suggests that health supports are provided professionally when nursing practices are conducted in the presence of nurse-patient dyad.

Although presence is a recently attended concept in in-office psychotherapy (Geller & Greenberg, 2002, 2012; Geller et al., 2010; Geller & Porges, 2014; Geller et al., 2012; Greenberg & Geller, 2001), it has been discussed that psychotherapy would be ended effectively and the relationship between counselling pairs would be productive when therapists show themselves present in the therapy sessions (Rogers, 2000). According to Anderson (2007) who declares that nursing presence establishes a long-term relationship between the patient and nurse, counsellors' presence could form a lasting communication between them and clients. This kind of presence is also considered important because a counsellor who presents a good level of such presence can easily teach the clients self-care methods, or coach them control their concerns and encourage them to behave positively (Finfgeld-Connett, 2008). However, the development of a comprehensive and coordinated concept of counselling module needs to endorse some characteristics which are discussed below.

First and foremost, the physical presence of counsellor is inquired a necessity in the therapy sessions that are generally seen as "being immediately present to his client, relying on his moment-to-moment felt experience in the relationship" (Rogers, 1989, p. 16). Nonetheless, unlike in-office sessions of psychotherapy, CME disembodies the presence of counsellor as well as clients. This argumentation is expressed important when technology change the border of presence in comparison to in-person centred therapy. For instance, asynchronous text-based therapy, standalone versions of care services (e.g. MoodGYM) or podcasts exclude therapists' presence as a function of therapy process. Virtual reality, although can employ avatars to animate a counsellor, yet portrays a dummy feeling of humans. Therefore, the physical appearance of counsellors should be worked to represent an optimal understanding of a human being in the real world.

In spite of the fact mentioned, the multi-layered counselling module should not be limited to use of counsellors' selves or their physical presence. In other words, counselling presence is not attuned to just bodily awareness as a tool to understand clients in CME. Rather, it is declared that clients who use technology will receive therapy services if (1) therapy is acted far more than an inward connection with clients' body and (2) there is an improved mediated access to counselling services (Coman, Burrows, & Evans, 2001). Regarding the first condition, some set of conditions encapsulates administrative and interactive steps that have to happen as in in-office setting (Granick, 2011; Afolabi, 1992). On the side of administrative steps, any kind of counselling designs, treatments and organization of therapy should be optimized for technology-based environment. It is to say that counselling presence in CME including human-based therapy process or programmed platforms such as apps or MoodGym has to satisfy the standard requirements of therapy by being transparent in communication, giving a high feeling of security, privacy, confidentiality and accuracy, warranting mutual sense of dignity, having strong role models and a sense of self facilitate therapy (Ackerman & Hilsenroth, 2003; Denkowski & Denkowski, 1982; Anderson, 2007; Doona et al., 1997; Kostovich, 2012).

In committing to a true sense of presence, Finfgeld-Connett (2005) believes strongly in the role of proficiency over the therapy methods. He thinks that such expertise can develop online a therapeutic relationship by increasing the understanding level of clients about the problems that have been instilled to therapy sessions. For example, it is suggested that cybertherapists need to be process-oriented, be willing to risk, work for small gains, help clients resolve the past through the therapy, have clarity about human development, respect clients' own power to change, respond to clients' clues, and enhanced by the clients' growth (Pemberton, 1977). Also, clients should perceive their therapists as present with a good established serving and communication skills as they have been assigned the key for productive therapeutic alliance (Geller et al., 2012). In the absence of physical information, it is also discussed that clients may disclose their problems or thoughts during cybertherapy more than face-to-face conditions, provided that cybertherapists establish not netiquette from the beginning of the telecommunication, but a collaborative monitored environment.

Regarding the second condition of counselling presence via technology, Table 1 enlists some other key properties. For example, human or assistant therapists need to clarify understandability and comprehensiveness of mediated communication by removing unclear or ambiguous information, messages, and paraphrase/summarize accurately the concerns of the client in their own short words. As this point, the experience level in telecommunication tools such as messaging or hardware contribute to the integration of

presence modules (Minicucci, 1997; Stein & Lambert, 1984). Meanwhile, it is an indispensable need to be trained to interact with clients in the lack of human interaction (Hutchison & Gerstein, 2012). Proficiency in verbal and nonverbal interaction will thus boost the expectancy level in computer-mediated therapy.

**Table 1.** General attributes of counselling presence

Listening	Silence	Openness
Authenticity	Humor	Trust
Understanding	Compassion	Respect
Commitment	Vigilance	Affirming
Reassurance	Sharing	Coaching
Touch	Confidence	Competence
Nonabandonment	Self-awareness	Continuity
Conscience		

On the other hand, computer-mediated counselling should be a realistic experience for the client's healing or consultation process. Counsellors or assistant therapists must ensure the conscious and professional sensation of therapy when the client's expresses his/her mental problems, feelings, malaise or moods (Simone, 1992). Furthermore, clients experience of therapists and therapy has a greater impact on the realism of therapy (Geller, 2012). Therapeutic presence via technology has to enable a client to feel fully perceived and understood. Realism is also achieved when technology adjusts every aspect of human-computer interaction such as providing a user-friendly interface and high quality medium of communication. Finally, to satisfy realistic counselling presence in technology, it is thought that the therapy process requires to be organized earlier. The client needs to be contacted and arriving into the therapy intervention has to be planned in advance; this case has also an association with the administrative section of action steps.

#### 1.4. Emotional Module Of Counselling Presence

Indeed, a positive relationship between client and counsellor can build a significant base to have a therapy be accomplished well (Norcross, 2011). Here, grounding the vital role of emotions on their social engagement is the main argument for an independent emotional module of counselling presence. Short, Williams, and Christie (1976, p. 65), for instance, had provided a classical characterization of social presence asserting that therapeutic presence is realized via interpersonal communication. Such interaction, however, is formed by social associations, intimate connections, or affiliations between present communicators that can be highlighted in bold for healing engagement. Communicators incorporate much of emotional information as a means to perceive the psychological status by the vast majority of daily conversations. This interaction entails the exchange of affective information about the pairs opinions, preferences and evaluations, which in turn indicate that affects dominate social interaction, or they are the major independent currency in which social/therapeutic relationships are transacted (Zajonc, 1980).

Emotions are also major independent determinants of presence because the users of telecommunication technologies 'feel' their presence. In other words, it is important in an affective interaction to know what sorts of feeling are being perceived in the speakers. Such feeling, indeed, relates to the emotional experience of individuals involved in CMC and certainly is different than perceiving the physicality of communicators or the perception of being present (Alcañiz, Baños, Botella, & Rey, 2003; Colosimo & Pos, 2015; Rey et al., 2004; Riva et al., 2007). For instance, people who are engaged in an online task can increase only the intensity of sociality of communication and thereby influence likely some slight behaviours (e.g. smiling) as yet the communicators may not impress the emotional involvement among each other. Therefore, emotional relationship to somebody is suggested a different independent factor than experiencing what a communicator says when he says that "... it is much less important for us to know whether someone has just said 'You are a friend' or 'You are a fiend' than to know whether it was spoken in contempt or (behaved) with affection" (p.153). On the other hand, the perception of emotions or affective expressions can influences independently the degree of awareness over the other communicator's emotional states and their reality (Alvandi, 2017,

Manstead et al., 2011, p. 159). For instance, Riva et al. (2007) show that individuals feel being in the virtual environment greater where they perceive emotions present or expressed explicitly.

The last but main argument in support of independent emotional module of presence arises when emotions affect professional life. Again referring to knowledge from E-learning studies, it has been shown that any negative change in the emotions of e-learners can decrease the efficacy in learning or teaching process (Kang, Kim, Choi, et al., 2007; Kang, Kim, & Park, 2007; Lehman, 2006). Similarly, an affective counselling presence requires assessing the level of emotional proximity with clients (Huang & Alessi, 1999; Rey et al., 2004). In this regard, Geller and Greenberg (2012) found that emotional disorders will be attuned if the client’s emotional presence was perceived by therapists highly detailed and reflective. Thus it is a concern that mental concerns can be inhibited where therapists have not a good understanding of emotions in artificial environments (Alvandi, van Doorn, Symmons, 2017b). Further, affective responsiveness, high level of emotional experience and emotional behaviours of therapy pairs are the key intensifiers in the therapeutic process (Fosha, 2001). They propose a great degree of emotional relatedness in therapy session (Dillon, Keogh, & Freeman, 2002). However, unlike social presence that shares the facts of social life, motives and also intentions of communicators (Manstead et al., 2011), emotional presence in clients incorporates their facts of desires or mental concerns. Due to the healing requirements, counsellors are responsible for managing and orienting expressed emotions. Research suggests uncomfortable feelings due to the client’s threatening or challenging tendencies cause the ineffective responses that are displayed by counsellors (Hayes, Gelso, & Hummel, 2011; Myers & Hayes, 2006). Therefore, it is suggested that emotional presence of counsellor is an important independent source of information about the clients’ personal behaviours; clients, for instance, disclose more of their emotional concerns when counsellors are emotionally present in therapeutic communication (Batten and Santanello, 2009).

1.4.1. Components of Emotional Presence in Remote Counselling

As discussed, the emotional module is not a single modality. In line with the definition of emotional intelligence, Table 1 locates three components of the module that has to be implemented in CMC: 1) feeling emotions that associates with perception and identification of emotions in counselling intervention (Alavndi, 2017b), 2) expressing emotions which informs counsellors about clients’ emotional disorders, 3) managing emotions that is a component to assists (mental health) professionals for regulating and conducting emotional supports effectively, and by using emotional information they can facilitate thinking process for better care (see for more details: Mayer, Caruso, & Salovey, 1999; Mayer, Roberts, & Barsade, 2008; Mayer & Salovey, 2007; Salovey, Brackett, & Mayer, 2004; Salovey & Mayer, 1989). However, the sense of emotional presence is intensified by means of other high-level features of communication such as connectedness, alliance, empathy, intimacy and immediacy that are discussed below.

**Table 2.** Components of emotional presence

<i>Main Components</i>	<i>Subcomponents</i>
Feeling emotion	Comfortableness
	Security
	Interest
Expressing emotions	Freedom
	Diversity
	Clarity
Managing emotion	Flexibility
	Activeness

<i>Main Components</i>	<i>Subcomponents</i>
Feeling emotion	Comfortableness
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	Clarity
Managing emotion	Flexibility
	Activeness

#### 1.4.2. Connectedness

Connectedness, a fundamental human motivation (Baumeister & Leary, 1995, p. 497), describes the basic principle of the relationship between users (Townsend & McWhirter, 2005). General type of connectedness associates with productive relationship when a user is actively involved with another user, object, group, or environment, and that involvement promotes a sense of comfort, wellbeing, and anxiety-reduction (Hagerty, Lynch-Sauer, Patusky, & Bouwsema, 1993). Emotional connectedness, in particular, is referred as a degree of affective relationship to which pairs feel actively involved with each other's emotions or objects in a CME (Rispen, Greer, & Jehn, 2007). In a nutshell, emotional connectedness is regarded as the capability that aims to balance the exchange of feelings in users and form a bond among them based on a good understanding and appreciation of affections.

Emotional connectedness, however, is distinguished from social (Lee, Draper, & Lee, 2001), task and cognitive senses of connectedness (Rispen et al., 2007). Firstly, this component differs from the social part of connectedness because social connectedness is characterized as a structure representing regularities in patterns of interpersonal relatedness in a virtual environment (Baldwin, 1992). In other words, social aspect of connectedness measures in a general way how users come together and interact within CME. While in the course of e-counselling or cybertherapy, emotional connectedness should represent the affective relatedness and emotional understanding that counselling pairs have; naturally, such connectedness is experienced when pairs are actively involved in communicating, perceiving and expressing each other (Rispen et al., 2007). Secondly, the emotional connectedness is incompatible with the task connectedness. In therapeutic language, the task connectedness that associate with counselling module of presence only represents the perception of clinical responsibility of perceived pairs who are actively involved with therapy and one another to accomplish their therapeutic tasks. Finally, emotional connectedness is unlike cognitive connectedness between pairs. What cognitive connectedness should offer is representing analytical relativity through psychotherapy process. This aspect of connectedness, in fact, should be placed in a cognitive module of presence where pairs speak about the therapeutic knowledge and are actively involved in accessing and employing the systematic therapeutic information.

Depending on the dominant counselling viewpoint, emotional connectedness could be regarded a function. On the basis of the literature (Baldwin, 1992; Townsend & McWhirter, 2005), this connectedness is well constructed within a progressing relational connection if dependence, engagement, loneliness, attachment, and affiliation were understood well between tele-communicators. Also, to load the emotional connectedness authoritative can recall consciously the previous emotional content of counselling interactions that have taken place with clients. Analysing the clients' psychological status can be another strategy for satisfied emotional connectedness. That said, counsellors can trigger the conceptualization of the clients into the discussion when those clients brought in their emotional problems to the counsellors' attention.

Emotional connectedness has also a deep influence on psychotherapeutic cooperation if its functions are regarded. In line with Bordin (1979), a review by Ackerman and Hilsenroth (2003) shows that positive connectedness felt early in the therapeutic relationship associates with “therapist training, consistency, nonverbal gestures (e.g., eye contact, leaning forward), verbal behaviours (e.g., interpretation, self-disclosure), and the maintenance of the therapeutic frame” (p.4). It has also been well reviewed that influential emotional connectedness in therapy can increase and develop patient's relationships with counsellors (Townsend & McWhirter, 2005). In their review, Townsend and McWhirter (2005) declare that mental health professionals would serve their patients further by cultivating within themselves a strength-based attitude as well as a non-judgmental observational stance toward their clients' emotional connectedness. It has also been suggested that positive connectedness explores a good sense of therapeutic presence during face-to-face psychotherapy (Geller & Greenberg, 2012). It is experienced when both therapy partners feel other's emotions or concerns are conveyed properly to the partner (Biocca & Nowak, 2001).

#### 1.4.3. Emotional Alliance

Emotional alliance is another sub-factor suggested here significant for an emotional module of presence. This factor is believed something more than connectedness because emotional alliance is a strong predictive indicator of emotional engagement (Johnson, 2012). It deals with the mutual emotional link, trust, and warmth between the counselling interactors (Sussman, 2004). and falls beyond the rational considerations of therapeutic relationship (Johnsson & Stenlund, 2010). This factor is fortified by emotive dimensions of therapy and is called a cognitive function for a higher-order emotional involvement (Wirth et al., 2007; Wirth et al., 2012). To put it in another way, understanding and analysing affective side of communication, describing and exploring emotional disorders are the results of this component.

The literature from face-to-face studies suggests that cognition, feeling and behaviours in clients relate directly to emotional alliance. For instance, an emotional alliance can enhance family relationships (Martin et al., 2000). It has also found that therapeutic outcomes improve where there is a well-conducted emotional alliance (Cook & Doyle, 2002; Hanley & Reynolds, 2009). Emotional alliance is also found effective in online counselling. For example, Posttraumatic Stress Disorder is decreased when there is a positive alliance between client and therapist via videoconferencing or telephone (Germain, Marchand, Bouchard, Guay, & Drouin, 2010; King, Bambling, Reid, & Thomas, 2006; Simpson & Reid, 2014). However, emotional alliance goes to a far greater extent for presence by the quality of the professional but affective relationship between the therapist and client (Geller & Greenberg, 2002, 2012). Appropriate emotional involvement may produce mutual understanding, affective and therapeutic consequences. The consequences of therapeutic behaviours such as selecting particular methods of therapy and relevant actions will also be warranted when psychotherapists engage emotionally with their clients (Wirth et al., 2012). Emotional alliance also oversees the way psychotherapists respond to affective communication from the client (Johnsson & Stenlund, 2010). In a nutshell, counselling pairs will feel mutually connected when they emotionally awarded and perceived within CME.

#### 1.4.4. Empathetic Relationship

It is a thought that the presence of counsellor does not mean only an ability to infer emotional states, adopt the perspective of clients or feel related to them (Andréasson, 2010; Davis, 1996). Rather, counsellors have to empathise with the clients. They need to be sensitive and understand totally the emotional states of their clients (Hassenstab, Dziobek, Rogers, Wolf, & Convit, 2007). Emotional empathy is, thus, a very much significant component in emotional module of therapeutic presence.

To empathize with clients and make an engaged emotional presence, while cognitive empathy enables counsellors comprehend clients' mental disorders (Hoffman, 1984; Smith, 2006), emotional empathy provides them the ability to react emotionally (e.g., compassion) to the clients' concerns (e.g., sadness) and provide a vicarious emotional support to the perceived emotional experience of clients (Mehrabian & Epstein, 1972). In other words, counsellors who are elaborated in taking emotional empathy online can dispense a good emotional corresponding to clients' needs. Further, the exploration of emotional empathy would aid the counsellors to develop a specific competency in delivering the emotional reactions and satisfying the emotional alliances (Hassenstab et al., 2007). There will also be empathic attunement with the clients when a counsellors resonate with the clients' experiences (Johnson, 2012). As expected, emotional empathy can further

influence the online treatment outcome (see: Elliott, Bohart, Watson, & Greenberg, 2011; Kurtz & Grummon, 1972).

#### 1.4.5. Higher Order Immersion

The engagement of users should also be invited in the studies of mental health via virtual reality. That would not only account the relativity and depth of physical and non-physical receptivity for counselling presence via technology, but also satisfy emotional module of their presence. Two elements, thus, are called from CMC research. Initially, intimacy of interaction is questioned which is beyond the physical proximity or body movements of counselling pairs. When considered, the level of intimacy can be rated by trust, association, familiarity, self-disclosure and affiliation between counselling interactors (Burgoon, Guerrero, & Floyd, 2016; Granick, 2011).

On the other hand, there is immediacy which is “the ability of the counsellor to get the client to focus on what is currently going on in the counselling relationship” (Afolabi, 1992, p. 34). Individual feedback, personalized exchanges, using inclusive language and concerns for others are elements of conducting immediacy. Immediacy is also marked by bodily behaviours (Mehrabian, 1981; Wiener & Mehrabian, 1968). For instance, people of counselling parties realize the immediacy with mutuality smile, nodding heads, and leaning forward (Ambady & Rosenthal, 1998). In particular, observing others’ relationship, gazes and eye contact communicates immediacy which should be regarded in videoconferencing-based therapy (Manstead, Lea, & Goh, 2011). It is well documented that facial expressions provides and regulates information for social interaction, empathy, emotional behaviours (Kleinke, 1986; Mathews, Fox, Yiend, & Calder, 2003; Newton, Burgoon, & Cahn, 1990). In addition to facial cues, voice intensifies reactions to emotional stimuli that become important functioning factors of interpersonal interaction and immediacy which has to be accounted with details in audio-based therapy (Berenschot et al., 2014; Minzenberg, Poole, & Vinogradov, 2006). Clients or counsellors can also behave gestures, give personal examples, address the other pair by his/her name, ask questions, discuss, encourage, feedback, and avoid tense body positions to promote immediacy. Finally, affective language should be inspected far more as it provides key semantic clues in terms of emotional disorders. It has been repeated that emotional prosody including direct and indirect affective conversation maximizes the understanding level of severity in emotional expressions in text-, audio-and video-based therapy (Pell, Jaywant, Monetta, & Kotz, 2011; Rigoulot & Pell, 2012; Schwartz & Pell, 2012).

Eventually, nonverbal immediacy seems a key factor to support clients to stay longer in the therapy process via technology. However, immediacy as well as intimacy can be influenced negatively if behavioural cues are misunderstood (Hutchins, 2003). Manstead et al. (2011, p. 168) demonstrate that the lack of mutual eye contact in users (importantly in avatars), for instance, can cause unawareness in the emotional expression through the gaze, which is ‘a key difference from co-present interaction’. Meanwhile, differences in the quantitative and qualitative transmission of nonverbal cues can contribute to the degree of nonverbal immediacy. In other words, due to the changes in the quality and quantity of immediacy and intimacy in CME, it seems that therapeutic presence via technology can be impacted negatively so that should be attended carefully by providers (Cobb, 2009).

## 2. Conclusion

The current curiosity aimed to undress the concept of presence reflected in mental health care when it is practiced via computer-mediated environment. Cybertherapy was introduced here a framework to provide an engaged counselling practice by reflecting a systemic approach to e-counselling or cybertherapy. On the basis of e-learning and telepresence studies, it is argued that therapeutic telepresence could not be achieved via physical or social appearances of users. Due to categorical processing within therapy, cognitive, counselling, and emotive domains are identified as critical modules in approaching the presence in cybertherapeutic environment. Depending on the research cited and argumentation provided, the components of presence are believed that can grant counsellors the ability to discern what is important for the clients.



However, the current model is the very first theoretical attempt and is an initial mapping of the territory for therapeutic telepresence. No study is found that has investigated the mediated sense of presence and whether that can generate emotional-therapeutic facilitation, improvement or inhibition in e-mental health / computer-mediated therapy. Presence in cybertherapy as well as its equivalent discussion from e-learning discipline is quite primitive and needs more consideration to provide an assessing and measuring instrument (Cleveland-Innes & Campbell, 2012; Kang, Kim, & Park, 2007). There is also a need for further systematic, empirical investigations which focus on the facilitation of emotional agency and therapeutic development in different computer mediate conditions. Studying the model in different conditions of delivery (e.g. text messaging, video-conferencing, and virtual reality) will also enable experts to refine pragmatically the concept of presence and its modules for psychotherapy via technology.

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