CENTERIS - International Conference on ENTERprise Information Systems /
ProjMAN - International Conference on Project MANagement / HCist - International
Conference on Health and Social Care Information Systems and Technologies,
CENTERIS/ProjMAN/HCist 2018

Wagnild and Youngs's Resilience Scale Validation for IS Students

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Abstract

This paper describes a quantitative study for the validation of the Wagnild and Young's Resilience Scale® to Information Systems Students. Individual resilience can be described as the person's ability to deal with problems, overcome obstacles, or resist the pressure caused by adverse situations, without entering into rupture. Therefore, resilience can have a significant role in students' education. However, little is known about the determinants that might undermine the resilience level of students, as well as which could affect their mental status and wellbeing, thus requiring new research efforts. This paper shows that Wagnild and Young's Resilience Scale® is suitable for Information Systems Students: Perseverance, Self-Reliance, Equanimity, Meaningfulness and Existential Aloneness, emerged as main themes from the principal components analysis, as in the original study by Wagnild and Young suggested. Additionally, it is demonstrated that health have influence in the individual resilience.

Keywords: Resilience; scale; information systems; students

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1. Introduction

Individuals play a very important role in organizations, mainly, by creating conditions that enable to overcome difficulties, as well as, to promote the organizational improvement and its overall performance. In this context, the individual resilience is a factor of success. Individual resilience can be described as the person's ability to deal with problems, overcome obstacles, or resist the pressure caused by adverse situations, without entering into rupture.

The word resilience had its origins in the Latin verb *resilire*, which can be defined as the ability to recover quickly from difficult and possible harmful situations [1]. As pointed by Charney [2] and Feder, Nestler, Westphal, and Charney [3], the construct of resilience refers itself to the ability of individuals to effectively adapt towards facing acute stress, adversity or trauma, without losing its psychological well-being and physiological equilibrium. Any situation has its own context of adversity [4], requiring adjustment mechanisms to deal with negative circumstances, and stressors, which are environmental stimuli demanding actions from an individual, team or even an organization [5].

The ability to properly deal with unexpected events, focusing on a set of actions to compensate the persistence of damaging circumstances, will require a specific set of competencies, experience and attitudes [6]. Therefore, resilience will enhance the individuals' recovery period and will guarantee a strengthened will, as well as, an increased resourceful repository for future situations [7], which is critical for human functioning and to organizational sustainability [8]. The resilience can also be used to characterize individuals' ability to overcome setbacks and to, somehow, measure their life achievements and career expectations or ambitions [9].

Therefore, resilience can have a significant role in students' education. However, little is known about the determinants that might undermine the resilience level of students, as well as which could affect their mental status and wellbeing, thus requiring new research efforts [10]. As argued by Schelfaut, Pannemans, Craats, Krywkow, Mysiak and Cools [11, p.831], "It remains yet innovative to have resilience measures implemented in an integrated and effective way and many opportunities to enhance resilience still remain".

The main objective of this article is the validation of the Resilience Scale®, which was originally created by Wagnild and Young [12], to Information Systems Students and to study if health has influence in the individual resilience. Thus, making available to educators a valid instrument which enables the evaluation of students' resilience and allow these professionals to identify those who require more attention. This scale gives to educators the opportunity to promote students' individual resilience, encouraging them to positively overcome difficulties and producing effective results, since personal resilience is viewed in terms of process and outcome, rather than as a fixed set of characteristics [13].

This paper follows a common structure. The second section discusses the study background. The third section describes the research methodology applied in this study. The fourth section presents the results and discuss the main findings that emerged from the research. Finally, the conclusions, as well as, the limitations and suggestions for future work, are discussed.

2. Background

Buckner, Mezzacappa and Beardslee [14] show that resilient people have a better mental health status, and provides individuals with all required qualities that enable them to successfully confront the new challenges and difficulties in their lives. Furthermore, Diener, Luca, and Oishi [15] and Sielber [16] point out that a good health will help the individual to manage their emotional reactions competently, gaining higher control over the life events that affects them, and being able to create a positive, supportive, and healthy environment. This will be possible because a health life will create the proper environment for retain the psychological control, as well as to leverage the new information about each situation to increase health and wellbeing. The positive emotions will provide an important buffer against the common adverse effects of stress, especially by increasing flexibility of thinking and problem solving [3, 17].

People differ in their perceptions, attitudes, and enlightenments about the environment and its circumstances. Each person is born with some predispositions, potentials, and constraints, and this diversity has ensured the species' sustainability over time [18]. However, some of us deal better with disappointments, unfulfilled expectations, and setbacks, without staying depressed or lost. Resilient individuals take advantage of this situations

to overcome weaknesses, trying to use the proper environmental stimuli, as well as to endure attitude as a key to self-improvement [19].

The identification of students' competencies that should be enhanced over the period spent working, learning and interacting with professors and colleagues in university is very important. Particularly, because it can create an important basis for future development, and especially for attaining happiness and personal fulfilment [20]. A good level of personal resilience should be supported by practicing attitudes of commitment, control, and challenge, which with the right amount of weight might turn out stressful changes into personal advantages [21]. These personal gains should be potentiated through group or team interactions and dynamics in order to create social support by giving and receiving assistance and encouragement. Notwithstanding, Bonanno, Galea, Bucciareli and Vlahov [22] show that perceived social support has positive impacts on resilience, and that resilience is a protective shield against depression. In the end, as mentioned by Coutu [23], "More than education, more than experience, more than training, a person's level of resilience will determine who succeeds and who fails".

The purpose of a resilience scale is to identify the degree of individual resilience, considered a positive personality characteristic that enhances individual adaptation (see Table 1).

Table 1. 25–Item resilience scale.

Code	Item
IRS_1	When I make plans, I follow through with them
IRS_2	I usually manage one way or another
IRS_3	I am able to depend on myself more than anyone else
IRS_4	Keeping interested in things is important to me
IRS_5	I can be on my own if I have to
IRS_6	I feel proud that I have accomplished things in life
IRS_7	I usually take things in stride
IRS_8	I am friends with myself
IRS_9	I feel that I can handle many things at a time
IRS_10	I am determined
IRS_11	I seldom wonder what the point of it all is
IRS_12	I take things one day at a time
IRS_13	I can get through difficult times because I've experienced difficulty before
IRS_14	I have self-discipline
IRS_15	I keep interested in things
IRS_16	I can usually find something to laugh about
IRS_17	My belief in myself gets me through hard times
IRS_18	In an emergency, I'm someone people can generally rely on
IRS_19	I can usually look at a situation in a number of ways
IRS_20	Sometimes I make myself do things whether I want to or not
IRS_21	My life has meaning
IRS_22	I do not dwell on things that I can't do anything about
IRS_23	When I'm in a difficult situation, I can usually find my way out of it
IRS_24	I have enough energy to do what I have to do
IRS_25	It's okay if there are people who don't like me

A resilience scale from Wagnild and Young [12] was, initially, developed from a qualitative study of 24 women who had adapted successfully following a major life event [12] and was available and pretested in 1988. For each female participant was asked to describe how she managed a self-identified loss. From their narratives, five

interrelated components were identified, namely: equanimity; perseverance; self-reliance; meaningfulness; and existential aloneness. These components, combined, measure a resilience level. Twenty-five verbatim statements from the interviews reflecting each of the five components were selected (Table 1). Ahern, Kiehl, Sole and Byers [24] evaluated the properties Psychometric adequacy and six tools for the study of resilience. Although resilience is difficult to measure and may vary from system to system [11], the Resilience scale® from Wagnild and Young [12] was considered the best tool for studying resilience in a variety of age groups and therefore selected also for this research study.

3. Method

The research strategy used to collect data was a questionnaire survey. The questionnaire was structured into three parts. Part A was divided in a series of questions designed to investigate which were the most useful actions to improve the project team resilience (out of scope of this paper, reported in (anonymized for blind review)). Part B was divided in a series of questions aimed to measure individual resilience using the resilience scale developed by Wagnild and Young [12] presented in Table 1. Part C of the questionnaire gathered information about respondents, namely about health aspects (depression, weight, practice of exercise, diet, etc.).

Respondents were asked to state the degree to which they agree or disagree with each resilience item. All items are scored on a 7-point scale, from 1 (strongly disagree) to 7 (strongly agree). The items are worded positively and reflect accurately the verbatim statements made by participants in the original study by Wagnild and Young [25].

The questionnaire was pretested with five students, namely to evaluate ease of understanding and time required to complete. Only minor revisions were required; for example, minor re-wordings to questions to remove ambiguities and slight changes to the layout of the questionnaire to improve readability.

We collected data from teams of Portuguese master's students. Each team was enrolled in one of the following three one-semester courses – "Technologies and Information Systems Project", "Information Systems Development", and "Information Systems Project Management". By collecting data from different courses, we aimed to minimize the bias caused by possible characteristics specific to a particular course. These courses are part of integrated master in information systems engineering and management and master in information systems programs. Each team was involved in the development of a semester-long IS project (as these are meant to prepare students for the work context in IS). Each participating project team had between three to six team members (a total of 131 questionnaires). The participants were asked to fill out the questionnaires and return it on site to the researchers. Strict confidentiality was stated in the questionnaire cover. The questionnaire took about 15 minutes to complete. Completed questionnaires were received from 115 participants. Three of the total 118 questionnaires received were not used in the analysis, due to incomplete responses, yielding a final response rate of 88%.

Most of the respondents were male (83%). The majority (55%) was between 23 and 30 years old, and 36% were work-students. The respondents participated in projects classified into four types: custom development (32%); information systems analysis (25%); consulting (25%); other, including business intelligence, workflow, etc. (18%). The average duration of the projects was three months.

In nine of the 28 students' project teams (32%) occurred at least one "crisis" situation (for example, one team member leaving the team prematurely or by internal conflicts). Data were analyzed using SPSS (Statistical Package of Social Sciences). Factor analysis were conducted to examine the internal consistency and Construct validity of the Resilience Scale.

Factor analysis is a collection of methods used to study the interrelationships among component variables. Construct validity refers to the accuracy of the measurement tool to measure what it intends to measure [26].

As stated by Bollen [27], factor analysis intends to simplify a concept by using relatively fewer underlying 'latent variables'. In other words, factor analysis can be used to simplify complex sets of data [28] and helps at exploring the underlying structure of the constructs in a model [29]. Factor analysis examines the correlations between the variables surveyed and can indicate if there is a significant 'overlap' amongst various subgroups of variables. As a result, a small number of 'latent variables' that explain most of the variance observed in a specific phenomenon are computed. If the correlation between variables is not significant, it is unlikely that the variables will present common 'latent variables' or factors. In summary, factor analysis infers the existence of a smaller number of 'latent

variables/ factors' which explain the behavior of the original variables. Factor analysis reduces a data set to a more manageable size while retaining as much of the original information as possible [30].

Prior to the factor analysis, Bartlett's test of sphericity and a Kaiser-Meyer-Olkin (KMO) test were conducted to help assess the factorability of the data. The Barlett's test of sphericity is designed to test if the correlation matrix for the variables is an 'identity matrix' (the null hypotheses), i.e. that all variables correlate only with themselves. The goal of the test is to reject the null hypothesis, with the results of the test indicating that the intercorrelation matrix does not come from a population with an intercorrelation 'identity matrix'. In other words, Bartlett's test of sphericity indicate if the correlations between items are or not sufficiently large to use factor analysis ($p<0.5$). The Kaiser-Meyer-Olkin (KMO) measures the percentage of common variance among the variables for a specific construct. KMO index ranges from 0 to 1, values of KMO close to 1 indicate that the factor analysis is significant; excellent if it is higher than 0.9 and good for values between 0.8 and 0.9. For values lower than 0.5, the factor analysis is not significant, because there is not a strong correlation between the variables. Furthermore, and in general, factor analysis is assumed to be appropriate if KMO is higher than 0.6, although 0.7 and above is a better indicator of 'factorability' [30, 31].

Having conducted the factorability, 'factor extraction' tests using Keiser's criterion and Scree plot analysis were conducted. 'Factor extraction' is the determination of the number of 'factors' necessary to represent the data [29]. Kaiser's test is one of the most commonly used techniques, otherwise known as the eigenvalue rule [30]. Using this rule, only the 'factors' with an eigenvalue greater than 1 should be considered for further investigation [29], whereas the Scree test involves plotting each eigenvalue associated with each extracted 'factor', and at the point the plot starts to level off in a linear manner often indicates the number of 'factors' to select for a specific construct. A combination of these techniques was employed in a complementary manner in this research.

The influence of physical exercise practice, ideal weight, careful diet, smoking, alcohol ingestion, and depression periods in the individual resilience score (calculated) was also analyzed. To investigate the influence it was used the independent samples t test. Conventionally, the significance value must be less than 0.05 in order to show an association between two variables [30].

4. Findings and Discussion

Cronbach's Alpha was computed to test the reliability and internal consistency of the responses. Cronbach's Alpha is 0.863 (25 items), which is considered excellent [32] (above 0.7 is a desired threshold, indicating a high degree of internal consistency in the responses).

Prior to the factor analysis, Bartlett's test of sphericity and a Kaiser-Meyer-Olkin (KMO) test were conducted to assess the factorability of the data. Barlett's test of sphericity should be $p<0.5$ to be significant, whereas, in general, factor analysis is assumed to be appropriate if KMO is higher than 0.6 (although 0.7 and above is a better indicator of 'factorability') [32]. Table 2 summarizes the factor analysis steps followed by this research and the results obtained to establish construct validity and better determine the structure of the 'factors' for measuring individual resilience.

Based on the nature of the questionnaire's items (IRS1 to IRS25), the following was determined:

- 'Factor'#1 (IRS4, IRS11, IRS13, IRS14 and IRS15), deal with the theme 'Meaningfulness';
- 'Factor'#2 (IRS1, IRS2, IRS6, IRS10, IRS18, IRS21 , IRS24 and IRS27), although IRS10 have loaded higher on 'Factor'#1 (RS10 'loads' in 'Factor'#2– 0.433 and in 'Factor'#1– 0.692), better representing the theme 'Perseverance';
- 'Factor'#3 (IRS8, IRS9, IRS16, IRS19 and IRS20) represents the theme 'Self-reliance';
- 'Factor'#4 (IRS3, IRS5, IRS22 and IRS23), although IRS5 have loaded higher on 'Factor'#1 (RS5 'loads' in 'Factor'#4– 0.491 and in 'Factor'#1– 0.569), better representing the theme 'Existential Aloneness';
- 'Factor'#5 (IRS7, IRS12 and IRS15) represents the theme 'Equanimity'.

Table 2. Factor analysis results.

Steps	Results and Comments
1. Determine if factor analysis applicable to data set	• All items have at least half of more of their correlation >0.3.
	• All data is suitable for factor analysis.
	• Kaiser-Meyer-Olkin = 0.923.
	• The data set is at the "excellent" level for factor analysis (Kaiser-Meyer-Olkin > 0.9).
	• Bartlett's test of sphericity is significant (p<0.001).
	• Almost all items have communalities above the threshold level, except for IRS2, IRS13, IRS16, IRS17, IRS18, IRS24, however all very near from the threshold 0.5.
	• The data shows factorability.
2. Determine number of 'factors'	• Eight 'factors' have an eigenvalue >1, explaining 64.4% of the total variance.
	• Scree plot shows that five 'factors' have an eigenvalue above 1, where the plot starts to flatten in a linear way.
	• Analyzing Keiser's criterion and Scree plot shows that this is a 5-theme construct.
3. Develop 'factor' structure	• Using rotation results, obtain 'factor' loading matrix Factor Analysis:
	• F1: IRS4, IRS11, IRS13, IRS14, IRS15.
	• F2: IRS1, IRS2, IRS6, IRS10, IRS18, IRS21, IRS24, IRS27.
	• F3: IRS8, IRS9, IRS16, IRS19, IRS20.
	• F4: IRS3, IRS5, IRS22, IRS23.
	• F5: IRS7, IRS12, IRS15.

There were slight differences in the categorization into themes of items of the resilience scale: the IRS10 ('I am determined') and the IRS5 ('I can be on my own if I have to'), as referred above; and in the IRS21 ('My life has meaning'), although categorized in the theme 'Perseverance' because the load is 0.754 ('Factor'#2), it was expected that this particular item would be more related to the theme 'Meaningfulness' ('Factor'#1), but the load is only 0.101.

In summary, the factory analysis conducted is a 5–theme structure. 'Perseverance', 'Self-Reliance', 'Equanimity', 'Meaningfulness' and 'Existential Aloneness' emerged as components from the principal components analysis, as the original study by Wagnild and Young [25] suggested. These results provide evidence for the reliability and validity of the resilience scale to measure resilience in Information Systems Students and therefore we can conclude that this is a useful instrument for studies which proposes to evaluate resilience and to guide education practice.

Additionally, results showed that those students who have ideal weight (t=2.452, df=113, p=.016) and who practices physical exercise (t=2.330, df=113, p=.022) have a higher individual resilience. As well as, that who never have depression periods (t=4.018, df=113, p<.001) have also a higher individual resilience, confirming Buckner et al. [14] statement that resilient people have a better mental health status. The same association was not verified related to the careful diet (t=1.289, df=113, p=.200), smoking (t=1.827, df=113, p=.070) and moderate alcohol ingestion (t=1.395, df=113, p=.166) of individuals.

Educators, being responsible for the positive development of their students, should focus on the qualities of each student to enable the development of professionals capable to promote the organizational improvement and its overall performance. The resilience evaluation is also important to guide practices and politics aimed at promoting a healthy development.

5. Conclusion

There are two main theoretical contributions of this research. First, this research builds knowledge in the area of Individual resilience, validating the Resilience Scale®, which was originally created by Wagnild and Young [25], to Information Systems Students. Secondly, it shows that health have influence in individual resilience, namely who

have ideal weight, practices physical exercise, and do not have depression periods, has a higher individual resilience. In the case of the last, it can be also an effect of a higher resilience.

Personal resilience might influence the students' path over their lifespan, therefore it is imperative to potentiate the personal traits that might contribute for the personal resilience increment, as well as, to create a confident character with self-awareness and with the clear judgment for coping in project teams in order to overcome the challenges faced during the learning process and to enhance the outcomes. The personal health condition is an aspect that should be considered by students towards strengthening the physical and mental predisposition to overcome the difficulties encountered, and as a way to improve personal resilience.

A main limitation of this study relates to the data, which has been collected in the same context (Portuguese students). Ideally the survey should be expanded, in order to guarantee a higher variety of IS students.

Further research will be conducted, based on a longitudinal study, in order to test the resilience score and the outcomes achieved, after addressing the convenient improvement suggestions to each student. In particular, it should be measured over time the progress of the resilience score, with other life aspects that could measure the life satisfaction level, among others that should correlate the life improvements with the development of personal resilience.

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