The creative exploration function of technologies: topic and measure for identity

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Abstract. Starting from the existing literature that focuses on the role of the use of new technologies in the cognitive, relational and social fields of individual development, this study intends to investigate the relationship between the use of new technologies and identity consolidation processes in a group of young Italian adults, focusing on an aspect not yet investigated relating to the identification of the functions that the use of new technologies assumes for identity development, in a group of young adults.

Keywords: human–computer interaction, identity exploration, learning.

1 Introduction

The debate on the risks / benefits of "computer-based technologies" is now wide and articulated. Recent studies have highlighted how the use of digital tools is now not only part of the custom of young people, but directly affects the cognitive, affective and relational development of the individual from the early stages of life [1]. Furthermore, from a socio-relational point of view, it has already been noted that the use of new digital technologies (for instance social media) is configured for adolescents and young adults as a form of social activity [2] and as a way of "self-documentation" of the events of one's [3]. It is also possible that digital technology is currently used to elaborate some of the development tasks, typical of adolescence and early adulthood, in particular in the formation of identity [4]. Developing a stable identity is a necessary prerequisite for healthy youth development (e.g., high levels of well-being, low distress and problematic behaviours) and for being able to solve subsequent life tasks such as committed partnership and parenting [5]. However, few are the studies relating to the role of technologies on identity achievement [6,7] and to technological efficacy as new identity category.

This study aims to focus on the processes that allow individual to achieve identity, proposing a new field of investigation, namely the *functions of technology for identity*. Indeed, the use of new technologies should be connected not only to more clinical aspects relating to the intensity and frequency of use, but also to the needs that are fulfilled through its use.

1.1 Optimal Identity: a pre-requisite for individual positive development

Erikson [5] conceptualized identity both as a conscious sense of individual uniqueness and as an unconscious striving for continuity of experience. Adolescents may move toward either of two poles: identity achievement and identity confusion. Drawing upon Erikson's theory, Adams and Marshall [8] proposed that, as a social-psychological construct, identity has certain properties and functions. In line with Erikson's notion of an "optimal identity", this latter was considered to have a self-regulatory function in the development of self, and it is defined as a "self-regulatory system which functions to direct attention, filter or process information, manage impressions, and select appropriate behaviors" (p. 433). Thus, to have a strong one's sense of identity synthesis (knowing who I am) makes individuals confident in their capacities and abilities, well-adjusted and directed by their meaning in life. Do not know who I am (identity confusion), on the contrary, renders individuals vulnerable for ill-being and negative psycho-social outcomes. Thus, acquire an optimal identity development is a key-element for individual well-being.

The optimal identity is understood both in terms of the positive outcome of a consolidation process (procedural identity models of which we have just spoken) and in terms of identity styles related to well-being and adaptation (model of socio-cognitive orientation individual). Berzonsky [9] postulated that individuals use different socio-cognitive strategies or processing orientations to deal with or avoid the task of identity formation: informational, normative, and diffuse-avoidant. Individuals with an informational orientation are self-reflective and tend to actively seek out and evaluate self-relevant information. They show high levels of cognitive complexity, problem-focused coping strategies, cognitive autonomy, and persistence. They are also critical of their beliefs and they seem particularly open to new information and to reviewing available commitments in order to define an integrated and consistent 'self' [10]. Individuals with a normative orientation adopt prescriptions and values from significant others and conform their plans to others' expectations. They are generally closed to new information if they feel it could threaten their personal convictions; they also tend to build their commitments in a rigid way and to maintain and preserve them. Individuals with a diffuse-avoidant orientation procrastinate and delay dealing with identity issues for as long as possible. They tend also to adapt their behavior and their views to external demands. Recently, some authors [11] have positioned the informational style as the most mature coping strategy, believing that this style encompasses two key elements of development: stability and change.

1.2 Connections between Technologies and Identity: what we know

Literature have mainly underlined the role of technologies on identity, conceiving new-technologies in terms of on-line developmental context. Indeed, digital contexts shape up to be relational contexts and offer opportunities to construct and play identity via anonymity and multiplicity. Palfrey & Gasser [13], as argued by Aricak et al., [12], suggested that playing several selves thanks to digital contexts offers to experiment the multiplicity but, at the same time, more confusion. The creation of numerous and various virtual identities can favour an identity fragmentation that does not allow the integration of the self and the choice of stable identity commitments, therefore the procrastination of a state of moratorium and diffusion. On the other hand,

self-experimentation of this type can help complete and integrate one's real identity [14]; it can help overcome some real-life difficulties especially with regard to relational identity [15]. However, new technologies are not just made up of social networks. Therefore, there is still an unexplored field with respect to the relationship between technologies and identity, for which this study aims to offer an initial contribution.

1.3 The current study: functions of technology for identity development

Summarizing, the studies on the relation between new technologies and identity are at an initial phase, but they have found results on issues concerning the discrepancies between on-line identity and off-line identity and they have explored mainly the relational domain. However, there is still an unexplored field related to the relations hip between the technologies (expanding their typologies beyond the social networks) and personal identity (in terms of styles and processes). From this comes the opportunity to focus on the processes that allow individual to identity synthesis, proposing a new field of investigation, namely the *functions of technologies for identity development*. In this view, the use of new technologies should be connected not only to aspects relating to the intensity and frequency of use, but also to the needs that are fulfilled through its use. To achieve this goal, alongside the evaluation of identity processes and styles, we have developed an ad hoc quanti-qualitative tool, labelled as "Technology Functions for Identity Measure" (TEFIM).

More specifically, we formulated two broad research question, as under:

Q1. Is there a link between identity processes and styles in the definition of optimal identity? We expect to identify profiles of participants with "optimal" characteristics linked to high scores in identity commitment processes and low scores in ruminative exploration, high scores in informative style and a profile of subjects with characteristics of identity confusion linked to high scores in avoidance style and ruminative exploration and low commitment.

Q2. What are the functions of the technologies that are indicated by the participants as important for the definition of identity? We expect to identify functions related to socialization (as already indicated in the literature), but we assume the presence of functions related to the consolidation of personal identity. We expect to detail the specificity of these functions from the participants' responses to the research.

2. Method

2.1 Participants

A total of 296 youth, aged 18-20 years (M = 19.5 years; SD = 7.5), attending the first year of university, took part in this study. The measures were administered during class time. Two researchers, familiar with the survey, attended classes to assist the respondents with queries. Participation in the study was voluntary and anonymity was guaranteed; the respondents did not receive payment for their participation. Completion time was between 20 and 40 minutes. Of the total number of respondents, 90% took part in the research.

2.2 Measures

Identity styles. The Italian version [16] of the revised Identity Style Inventory (ISI-3;[19]) was used. This measure consists of 30 items scored on a scale ranging from 1 (not at all like me) to 5 (very much like me). Cronbach's alphas were .60 for scores on the informational style subscale, .59 for scores on the normative style subscale, and .73 for scores on the diffuse-avoidant style subscale.

Identity Processes. The Italian version [17] of the Dimensions of Identity Development Scale was used to assess five identity dimensions. The DIDS includes 25 items (5 items for each identity dimension) with a response scale ranging from 1 (completely disagree) to 5 (completely agree). Cronbach's alphas of these dimensions were .90, .85, .71, .70, and .79 respectively.

Technologies' Functions. An ad hoc quanti-qualitative tool, labelled as "Technology Functions for Identity Measure" (TEFIM), was designed to investigate four areas: a. the *concepts* of "new technology" (open-ended question); b. the *types* used (6 items) and their frequencies (with a response scale ranging from 1 (never) to 5 (everyday)); c. the identity *functions* attributed to the use of technology (4 items) and d. the *value* attributed to these functions for one's own well-being (open-ended question).

2.3 Analyses plan

In order to address the Q1, we implemented the consolidated procedure for examining identity statuses based on cluster analyses following the. [35] procedure. Thus, we first standardized the scores for the identity dimensions and, following Gore's [36] two-step approach, we conducted hierarchical cluster analyses using Ward's method based on squared Euclidian distances. On the basis of three criteria (theoretical meaningfulness of each cluster, parsimony and explanatory power), in our sample a six-cluster solution was also found to be the most acceptable. Second, with a view to assessing the effect of identity statuses' membership on the identity styles, we crossed the empirically verified identity statuses with the three styles (informative, normative, avoidant) using univariate ANOVAs.

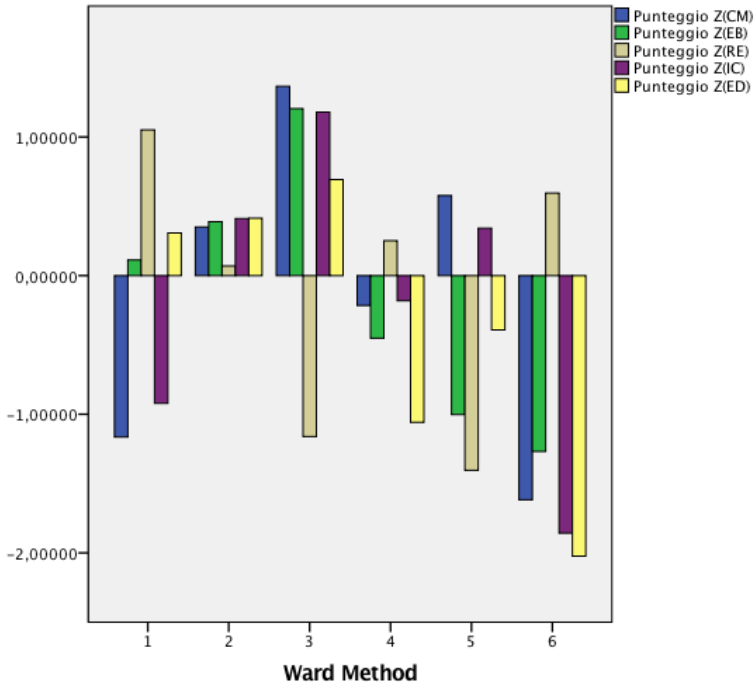
In order to address the Q2, we performed descriptive statistics and content analysis of the qualitative part of the measures adopted, using the identity statuses' cluster membership of participants (from the quantitative cluster analysis) as representative variable associated with the technologies' functions emerged from the analysis of the answers to TEFIM. In this way we were able to explore whether function of technologies, reflecting a particular process for identity consolidation, is associated with a specific identity status and style.

3. Results

3.1 Identity processes and styles: undifferentiated and normative youth

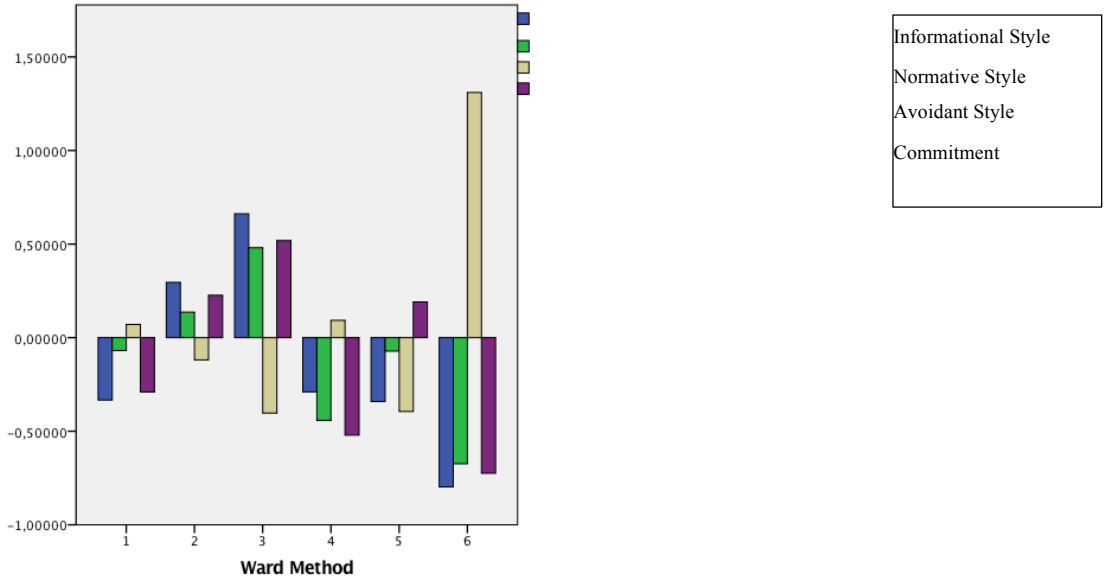
Cluster analysis on the five identity dimensions was conducted through a k-means algorithm using as initial cluster centres those obtained in a larger study on Italian identity profiles clusters [17]. The latter were obtained through a two-step procedure with hierarchical clustering followed by k-means clustering. The six-cluster solution was evaluated in terms of substantive interpretability, parsimony and explanatory power. The final cluster solution, explaining between 44% and 65% of the variance in the identity dimensions, was comparable with the solution of the larger study on Italian identity profiles.

Figure 1 presents the final six-cluster solution. Moratorium cluster was characterized by moderate scores on all three exploration dimensions and low scores on the commitment dimensions; Undifferentiated cluster was characterized by relatively moderate scores on all identity dimensions; Achievement was characterized by high scores on commitment making, identification with commitment, exploration in breadth, and exploration in depth, and low score on ruminative exploration; Attenuated disturbed diffusion by middle-low scores on all dimensions, except for ruminative exploration with middle-high score; Foreclosure by high scores on the commitment and low scores on the exploration dimensions; and finally, the Disturbed diffusion (by low scores except for a high score on ruminative exploration. The clusters that appeared to have a greater number of subjects were the Undifferentiated (42.17%), followed by the Moratorium (17%), the Foreclosure (13.65%), the Disturbed Diffused (12.45%), while the smaller cluster was the Disturbed diffusion status (6.02%). Only 8.43% of our students appeared to have a state of Achieved identity (see Fig. 2).



Commitment Making
Exploration in Breadth
Ruminative Exploration
Identification with Commitment
Exploration in Depth

To summarize and identity styles profiles associated with identity status, we drew the bar plot with mean scores for each identity status (Figure 2). In general, Moratorium scores middle–low on informative and normative styles, middle on avoidant; Undifferentiated scores middle-high on informative and normative and middle on avoidant; Achievement scores high on informative and normative and low on avoidant; Attenuated Disturbed diffusion scores low on informative and normative styles, middle on avoidant; Foreclosure scores middle-low on all the three styles; and Disturbed diffusion, according to literature, scores low on informative and normative styles, high on avoidant. Post hoc analyses confirmed that Achievement has the highest level of informative style, The Undifferentiated has the highest level of normative style; and Disturbed Diffusion has the highest level of avoidant style.



3.2 Technologies' Functions for Identity: creative exploration and learning

As hypothesised, the respondents have described the new technologies in differentiated typologies: *sophisticated tools that help people* (59.52%); *internet and social networks* (49.66%); *games* and *entertainment* (18.37%). With regard to the technologies' functions for identity, the respondents reported as follows: *exploring, discovering, creating* (72.54%); *learning, studying, working* (55.59%) *socializing and meeting new people* (33.22%). We have labelled the first as *creative exploration function;* the second as *learning function*; the third as *relational function.*

As regards the specificity of the technology functions in relation to the identity profiles, from our data it emerges that *creative exploration function*, in addition to being the most reported, is also transversal to all profiles; the *learning function* is also reported from Achieved and Undifferentiated youth, while the *relational function* is

mainly reported by Attenuated Disturbed Diffused youth. The diagram in figure three describes the synthesis of the findings.

Technologies' Functions for Identity	Identity statuses	Identity styles
Creative exploration function	All	All
Learning function	Achievement and Undifferentiation	Middle high informative and normative
Relational function	Attenuated Disturbed Diffusion	Avoidant

4. Discussion

The present study was designed to give a contribution to an unexplored field named *functions of technologies for identity* about the relationship between the technologies and personal identity (in terms of styles and processes). Findings obtained in the present study about the link between identity processes and styles in the definition of optimal identity confirmed our hypothesis. In fact, participants with achievement identity status show the highest level of informative style and, on the opposite, participants with diffusion identity status show the highest level of avoidant style. These findings are consistent with previous research [18] and Erikson's theory according to which people with a coherent sense of identity show an integration between earlier identification and identity explorations that it is possible to find in the relationships between identity styles, statuses and functions (optimal identity).

Moreover, analysing the cluster configurations, we can underline that the most part of the participants are classified in the identity status undifferentiated with the highest level of normative style. A large number of undifferentiated has also characterized findings of our previous research [19]. A possible interpretation of this data in Italian context could be that they have to face the challenges of a distress context. On the base of that, in order to explain the associations between undifferentiated status and normative style we could introduce the hypothesis that a possible strategy to cope with that is to conform themselves to the others' prescriptions, values and expectations (as typical of normative style).

With regard to the link between functions of technologies and the identity profiles described, the findings have highlighted that the majority of respondents use technology as a via to creatively explore their identity and to improve the vocational domain of identity through learning processes and tools; a minor part of respondents described the socialization as the prevalent function of technologies' use. This suggests that new technologies are not only the Social Networks and they have to be considered

focusing on their complexity and multiple uses. The uses emerged as mostly related to identity exploration in depth and in breadth dimensions.

4.1 Limits

The present findings should be considered in light of some limitations. First of all, we used a cross-sectional design that does not offer data about causality or directionality. For future studies longitudinal designs are needed. Then, our participants are only students at their first year of university, so it is not possible to generalize our results to other ranges of age. Therefore, it will be necessary to improve the range of age to consider adolescents and emerging adults too.

4.2 Conclusion

According to what we have highlighted and discussed, the study suggests that the relationship between technology and identity should also be investigated in relation to the functions it performs for optimal identity and not only in terms of possible distorting effects on identity (self-discrepancy) or addiction (understood as time of use). Considering, moreover, that the various types of technologies do not allow a univocal discourse. New technologies must, in fact, be considered and studied as developmental tool/context and, as such, it does not have positive or negative connotations, but neutral characteristics that assume connotations according to the functions they perform for the individual.

The approach introduced with this study aims at shifting the attention to the use of new technologies as a process integrated with identity building processes. From the present exploratory study, it seems to emerge that new technologies are used with functions mainly related to the individual's exploratory, creative and cognitive processes thanks to their characteristics and their cognitive implications. In this sense, technologies provide an instrument of identity construction closely linked to the personal sphere of the individual.

Finally, these data give indications on the opportunity to think and create intervention programs to support the optimal identity that also include new technologies as tools for interaction and intervention. This with a view to providing psychological support tools continuous over time, which can compensate for any temporary suspension of interventions in the presence for external causes.

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