

Learning Strategies and Interpersonal Relationships of Students Learning Cooperatively Online

Jonathan Kaplan *

Institute of Sciences and Practices of Education and Training (ISPEF)
Lumière University Lyon 2, 86 Rue Pateur, 69365 Lyon, France **
kaplan@kaplan-consultants.org

Abstract. Adult learners studying cooperatively are thought to have an innate predisposition to help each other in the process of learning, but cooperation among learners online who do not necessarily know each other may not occur spontaneously. It has often been suggested that learning online requires being autonomous and able to effectively regulate one's learning. Research using two scales, one to measure Self- and Co-Regulation (SCoR) of learning, the other to measure interpersonal relationships, was carried out with first-year Master's in education students (N=38) taking an online course in quantitative research methodology. The course was designed using a cooperative learning method enabling to study SCoR strategies in relation to the quality of interpersonal relationships, as well as achievement in this setting. The research is presented. Conclusions point to the role of individual anticipation strategies and to the quality of peer relationships in relation to higher achievement.

Keywords: Self-Regulation, Co-Regulation, Interpersonal Relationships, Cooperative Learning, e-Learning

1 Introduction

Directions for research have been suggested in pursuit of bettering online learning on the basis of principles that can apply to learning with social media [10]. Among the proposed directions, areas that relate to peer interactions included dialogue and empathy. Questions such as the eventual need to learn how to be dialogic when learning online, learning to be attentive and accepting of others' opinions were raised. Empathy, which entails feelings, cannot be taught. Can online learners feel empathy towards peers and provide them with support in

* Cite as: Kaplan, J. (2016). Learning Strategies and Interpersonal Relationships of Students Learning Cooperatively Online. In L. Uden et al. (Eds.), *Learning Technology for Education in Cloud - The Changing Face Of Education* (Vol. CCIS 620, pp. 103-111). Springer. doi 10.1007/978-3-319-42147-6_9

** Education, Cultures & Policies (EA 4571) research unit. CHArt-UPON (EA 4004) research unit.

environments where knowing others is often knowledge at a distance? The research presented here ventured to study strategies that learners use to manage their learning process in conjunction with the quality of interpersonal relationships. Thirty-Eight distance learning students in a first year Master's programme using Blackboard Learn¹ to interact, responded to two scales, ERICA [11], an instrument that was developed in order to study Self- and Co-Regulation (SCoR) strategy use when learning; and EQRI [15], an instrument designed to measure interpersonal relationships. ERICA was developed to measure strategies that adult learners deploy when studying in any environment such as when learning online, and to address the absence of an instrument designed to measure co-regulation.

2 Learner Action Oriented Strategy Use in Regulating Learning

The conceptual model of regulation phases that served the development of ERICA is a goal oriented model which builds on Zimmerman's [18] three phases of self-regulation but in which monitoring is separated from Zimmerman's Performance or Volitional Control phase. The conceptual model further adds a decision making phase drawing from Heckhausen's Rubicon model of action phases [7,1,2]. Kaplan's conceptual model [9] thus comprises of four regulation phases conceptually preceding, taking place during and following the core cognitive activity (action of learning). These are: Anticipation, Monitoring, Assessment, and Decision making. Macro-level strategies that can be observed with ERICA relate to these four phases. They are: Individual Anticipation of materials and References (IAR), Individual Environmental Control (IEC), Individual Tracking and Monitoring (ITM), Collective Evaluation of Content (CEC), Individual Evaluation of Method (IEM), and Collective Decisions for Method change (CDM). The measures of levels of use of these strategies are scored 0–4 on a Likert-type scale.

3 Interpersonal Relations

Studying interpersonal relationships can shed light on regulations carried out with others. CEC and CDM are such regulations. Sénécal et al. [15] validated a scale to measure the quality of interpersonal relationships. The scale was chosen for the purpose of studying the hypothesis of a relation between the quality of interpersonal relationships and co-regulation. The scale measures five spheres of relationships: relationships with family members, love relationships, relationships with friends, relationships with peer learners, and relationships with people in general. Each of these spheres of relationships is expressed with four attributes that respondents score on a Likert-type scale graded 0–4.

¹ Blackboard Learn is a trademark of Blackboard Inc. and an e-learning platform the company commercialises.

4 Research Hypothesis and Method

The research aimed at studying SCoR strategy use by students in a given educational situation; relations that may exist between these SCoR strategies and the quality of interpersonal relationships; and, relations SCoR strategy use and interpersonal relationships may have with academic achievement. The exploration of strategy use may be valuable for future research in order to identify patterns that may exist in the way students regulate their learning in specific learning environments and contexts. The primary interest regarding this research was to shed light on regulation strategies when using an instructional design that deploys a Cooperative Learning (CL) method [16] in the realm of e-learning. The hypothesis was that a positive relation would exist between more frequent use of co-regulation strategies and the quality of interpersonal relationships. Cooperation among adult learners [8,9] could rely on empathy between learners. In the situation studied in the research presented here, cooperation was externally motivated through teacher instructions and by providing criteria for grading that rely on cooperation. Even though the use of incentives may compensate personal propensity for social relationships, it was assumed that personal characteristics could play a role in group performance, reflected in course grades. Course grades served as an indicator of the quality of performance since the grading was based on the outcome of assignments to be carried out collectively.

4.1 Course Description and Design

Respondents (N=38) were graduate students in their first year of an Education Master's that is run online. The digital campus for education sciences² is run conjointly by two French universities and the French national centre for distance education. Respondents were taking a course on quantitative research methodology that used a CL design. The course took place during the second semester of the 2014–15 academic year. It began by convening the learners on campus during which a face-to-face session with the course instructor took place. The purpose of the class was to engage students in the process, explain the course design and tasks to be carried out, answer students' questions, form CL groups, and generally offer a friendlier opportunity to get to know the instructor and peers. This was the only opportunity during this course for students to meet with their instructor who from that point onward interacted with students online only. Eight groups were formed by the students, each with four to seven participants. On the Web-based e-learning application, each group had private group services including a forum with file exchange means. Groups could not access other groups' online services, but could conduct online conversations in other areas such as the general first-year Master's forum. Students were instructed to use their group's forum for all matters related to their learning in the course and hand in work for the instructor to monitor and assist with in their private group space. Students

² Formation et Ressources en Sciences de l'éducation (FORSE) <http://www.sciencedu.org>

were advised to help each other in the process of understanding the educational materials of the course and generally cooperate during their learning. The main assignment given each group was to come up with a research question, devise a small survey to study the question and submit it to all the other students taking the course, to statistically analyse the results and to hand in a report including their findings. The report had to also include a personal account, annexed by each participant, of the student's contribution to the group's work and had to have the account signed by the other group members as a mark of approval. Group members were all given the same score for their collective production. The final grade for the course, given to each student, was based on the group's score for 70% of it. The remaining 30% was made up of a score given on the basis of the personal account annexed to the collective report of the student's participation in the group's effort. All students also learned during this process from the other groups when they responded to other groups' questionnaires. Questionnaires had to include instructions for respondents, comply and inform about ethical considerations such as confidentiality and privacy matters.

Participants received an e-mail with an invitation to take part in the research survey at the end of the 12-week course. The e-mail contained the Web address of the survey questionnaire. Participants were asked to provide their student numbers in order to enable to later associate their responses with their course grades. In the e-mail and in the instructions on the first page of the online questionnaire, a commitment to confidentiality and to preserving anonymity was stated. All data manipulations were ensured to be carried out using software in such a way as to not reveal personal identity.

5 Research Results

Analyses were carried out using R, version 3.2.2 [13]. Respondents were 38 students (34 female and 4 male). Their ages ranged 22–55 years ($M = 34.76$, $SD = 8.84$). Descriptive statistics and internal consistency reliability using Cronbach's alpha [3] are provided for each dimension of ERICA in Table 1. Values higher than .70 are considered to be adequate [12]. The value for IAR is acceptable and is good for the remaining dimensions. The gamut of the scale gradation is 0–4, where 0 represents the response: 'I never thought of doing this', referring to the regulation strategy, and 4 representing the response: 'I do this systematically'.

Descriptive statistics and internal consistency reliability, tested using Cronbach's alpha, are provided for each sub-scale of EQRI in Table 2. The values for relationships in general (General in Table 2) is good and excellent for the remaining sub-scales. EQRI scores are calculated by adding item scores for a type of relationship. Responses to each item can range 0–4. Added together the score for each type can therefore range 0–16.

Grades can span 0–20. In this course the min. grade was 8.3 and the max. was 16 ($M = 12.86$, $SD = 2.68$).

Table 1. Internal Consistency and Descriptive Statistics for SCoR Dimensions

| Dimension | α | Min | Max | M | SD |
|-----------|----------|-----|-----|------|------|
| IAR | 0.74 | 0.8 | 4.0 | 2.74 | 0.68 |
| IEC | 0.87 | 0.6 | 4.0 | 2.76 | 0.94 |
| ITM | 0.81 | 0.0 | 4.0 | 1.63 | 1.06 |
| CEC | 0.84 | 0.0 | 3.6 | 1.75 | 0.80 |
| IEM | 0.88 | 0.6 | 3.0 | 2.04 | 0.72 |
| CDM | 0.83 | 0.0 | 2.4 | 1.21 | 0.74 |

Table 2. Internal Consistency and Descriptive Statistics for EQRI Sub-Scales

| Sub-Scale | α | Min | Max | M | SD |
|-----------|----------|-----|-----|-------|------|
| Family | 0.96 | 0 | 16 | 13.00 | 3.77 |
| Love | 0.92 | 3 | 16 | 13.91 | 3.35 |
| Friends | 0.92 | 6 | 16 | 13.44 | 2.79 |
| Peers | 0.90 | 4 | 16 | 10.15 | 3.32 |
| General | 0.85 | 6 | 16 | 11.35 | 2.57 |

6 Analysis of Correlations

Intercorrelations for each scale and correlations between ERICA and EQRI dimensions as well as with age and course grades were sought (see Table 3). Intercorrelations between ERICA dimension are significant for IAR with IEC ($r = .364, p = .027$) and for IAR with ITM ($r = .442, p = .007$). These moderate correlations demonstrate that students who individually anticipated materials and references for their learning also controlled their environment and deployed tracking and monitoring strategies more. Students who tracked and monitored their learning also controlled their environment ($r = .379, p = .021$), evaluated methods they used (IEM) ($r = .366, p = .026$) and made decisions collectively (CDM) ($r = .417, p = .014$). This points to the central role of tracking and monitoring for self-regulation of learning, as noted by Steffens [17], in the service of adjusting environmental parameters, evaluating methods and making choices through discussion with others. In accordance with the conceptual model [9], assessing the adequacy of methods deployed and making decisions about strategies rely on metacognitive input made available through tracking and monitoring. Collective decision making is not only positively linked to individual tracking and monitoring but also to individual evaluation of method ($r = .462, p = .005$). Collective evaluation of content (CEC) however, is not significantly correlated with the use of other SCoR strategies in this study.

Intercorrelations among EQRI dimensions point to only one significant link, between the quality of relationships with friends and relationships in general ($r = .588, p = .000$). This may point to respondents confounding these two types of relationships. Correlations between SCoR strategies and the quality of relationships reveal that there is a positive relation between individual anticipation of resources (materials and references) and the quality of intimate love relationships ($r = .380, p = .029$) and that there is a positive relation between individual environmental control and the quality of relationships in general ($r = .369, p = .025$). These findings indicate that affective dimensions are related to preparing for cognitive processes to come, a future oriented perspective demonstrated when the quality of the love relationship is stronger. Furthermore, the quality of relationships in general is positively linked to providing oneself with suitable surroundings and befitting environmental conditions for learning.

Interestingly, individual anticipation of resources is carried out more by older students ($r = .406, p = .013$). These older students might have developed through experience, strategies that are more advantageous to the learning process. As these self-regulation strategies are also positively linked to student grades ($r = .407, p = .017$) it is reasonable to infer that longer experience in educational settings led to developing more effective strategies, reflected in higher grades as an indicator of achievement. Last but not least is the positive relation between the quality of relationships with peers and grades ($r = .493, p = .006$). This positive relation can probably be imputed to the instructional design of the course which used a CL method.

Table 3. Intercorrelations, Correlations Between ERICA Dimensions, EQRI Dimensions, Age and Student Grades

| | IAR | IEC | ITM | CEC | IEM | CDM | Fam. | Love | Frien. | Peers | Gen. | Age |
|---------|--------|-------|-------|-------|--------|-------|------|------|---------|--------|-------|------|
| IAR | 1 | | | | | | | | | | | |
| IEC | .364* | 1 | | | | | | | | | | |
| ITM | .442** | .379* | 1 | | | | | | | | | |
| CEC | .215 | .085 | .238 | 1 | | | | | | | | |
| IEM | .294 | .153 | .366* | .288 | 1 | | | | | | | |
| CDM | .296 | .032 | .417* | .252 | .462** | 1 | | | | | | |
| Family | .043 | .033 | .057 | -.141 | -.253 | -.183 | 1 | | | | | |
| Love | .380* | .243 | .206 | -.001 | .195 | .290 | .156 | 1 | | | | |
| Friends | .010 | -.096 | .129 | -.276 | -.048 | .038 | .301 | .281 | 1 | | | |
| Peers | .160 | .049 | -.101 | .071 | -.180 | -.211 | .179 | .151 | .271 | 1 | | |
| General | .199 | .369* | .186 | .006 | -.016 | .159 | .264 | .283 | .558*** | .273 | 1 | |
| Age | .406* | .318 | .043 | -.071 | .067 | -.108 | .255 | .104 | -.264 | .003 | -.144 | 1 |
| Grade | .407* | -.023 | .265 | .281 | .023 | -.088 | .039 | .058 | -.073 | .493** | .080 | .159 |

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

7 Conclusions

Analyses provide indications on the use of strategies at the macro-level [6], deployed by learners in their first year of an online Master's in education programme. The data collected at the end of a course on quantitative research methodology which was designed using CL elements, provides a basis for future studies of SCoR strategy use in conjunction with other constructs related to cognition, metacognition, motivation, volition and affect. Studies of these constructs that involve environments using different instructional designs could enable comparisons to further elucidate which cognitive and metacognitive salient strategies students use in relation to course design and environmental features. Students may not use strategies to the same extent in different learning environments. Studying differences in strategy use would help develop awareness of the play between environmental factors and student learning regulation strategies, including their ability to self- and co-regulate autonomously [4,14,5].

One of the questions that was introduced at the beginning of this paper was the proclivity for collective regulation strategies when using an instructional design that deploys a CL method. In future research, a quasi-experimental research design with a group of students using a CL method and a control group backed by an individualistic instructional design could shed light on the hypothesis of different types of regulation strategies deployed in courses using different instructional designs.

The analysis of the data gathered in this research did not support the hypothesis that a relation exists between more use of co-regulation strategies when stronger interpersonal relationships were reported, apart for relationships with peer students. None of the types of interpersonal relationships correlates significantly with either collective evaluation of content (CEC) nor with collective decision making for change of method (CDM). Perhaps the CL design of the course had a stronger effect on the co-regulation strategies that learners used, overshadowing any relation that may exist to the quality of interpersonal relationships other than relationships with peers. On the other hand, relationships with peers are positively linked to group performance, reflected in higher course grades. This suggests that the cooperative climate of the group, the capacity of its members to work together towards goals and achieve the expected learning outcomes, is not primarily a matter of their co-regulation as much as the mix of personal characteristics that come into play in the way the group forms a productive and effective community of peer learners. It is noteworthy that groups who did function well in terms of forming a learning community supporting each other's learning cooperatively, were higher achievers. Studying various other variables that may play a role in forming a favourable climate for cooperation among learners would be useful. Another variable that is linked to achievement is more use of individual anticipation of materials and resources (IAR) for learning. Though IAR is positively correlated to student age, older students are not better achievers ($r = .159$, ns).

Further investigation of SCoR strategies in CL situations in conjunction with affective dimensions such as empathy and the quality of dialogue should enable

better understanding of environmental conditions that promote them. Supporting empathy and dialogue would enable reducing incentives and instructional prompts to cooperate. Learning cooperatively can then rely on autonomous motivation and ensuing autonomous regulation of learning. Autonomous motivation and regulation are important to autonomous learning which is characteristic of adult learners and is particularly appropriate to learning online. Studying learner well-being in conjunction with autonomy is another direction that could shed light on conditions that predispose learners to cooperate. Conditions for gaining confidence in peers' contributions to the collective effort is still another direction for future research.

References

1. Achziger, A., Gollwitzer, P.M.: Motivation and volition in the course of action. In: Heckhausen, J., Heckhausen, H. (eds.) *Motivation and action*, pp. 272–295. Cambridge University Press, Cambridge (2008)
2. Achziger, A., Gollwitzer, P.M.: Motivation and volition in the course of action. In: Heckhausen, J., Heckhausen, H. (eds.) *Motivation and action*, pp. 275–299. Cambridge University Press, Cambridge (2010)
3. Cronbach, L.J.: Coefficient alpha and the internal structure of tests. *Psychometrika* 16(3), 297–334 (1951)
4. Deci, E.L., Ryan, R.M.: *Intrinsic Motivation and Self-Determination in Human Behavior*, vol. *Perspectives in social psychology*. Plenum, New York (1985)
5. Deci, E.L., Ryan, R.M. (eds.): *Handbook of Self-Determination Research*. University of Rochester Press, Rochester, NY (2002)
6. Greene, J.A., Azevedo, R.: A macro-level analysis of SRL processes and their relations to the acquisition of a sophisticated mental model of a complex system. *Contemporary Educational Psychology* 34(1), 18–29 (2009)
7. Heckhausen, H., Gollwitzer, P.M.: Thought contents and cognitive functioning in motivational versus volitional states of mind. *Motivation and Emotion* 11(2), 101–120 (1987)
8. Kaplan, J.: From self-direction to co-direction in adult cooperative learning. In: Brigham, S.M., Plumb, D. (eds.) *Connected Understanding: Linkages Between Theory and Practice in Adult Education*, pp. 176–180. *Adult Education – Congresses*, Montreal, Quebec (2010)
9. Kaplan, J.: *L'autodirection dans les apprentissages coopératifs: Le cas des Cercles d'Étude*. Éditions Universitaires Européennes, Sarrebruck (2010)
10. Kaplan, J.: Applying adult cooperative learning underpinning principles to learning with social media - an overview and implications for research. In: Uden, L., Liberona, D., Welzer, T. (eds.) *CCIS 533*, pp. 93–103. Springer (2015)
11. Kaplan, J., de Montalembert, M., Laurent, P., Fenouillet, F.: ERICA - an instrument to measure individual and collective regulation of learning [ERICA - un outil pour mesurer la régulation individuelle et collective de l'apprentissage] (submitted)
12. Nunnally, J.C.: *Psychometric Theory*. McGraw-Hill, New York (1978)
13. R Core Team: *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. URL <https://www.R-project.org/> (2015)
14. Ryan, R.M., Deci, E.L.: Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist* 55(1), 68–78 (2000)

15. Senécal, C.B., Vallerand, R.J., Vallières, E.F.: Construction et validation de l'échelle de la qualité des relations interpersonnelles (EQRI). *Revue européenne de psychologie appliquée* 42, 315–322 (1992)
16. Slavin, R.E.: *Cooperative Learning: Theory, Research and Practice*. Allyn & Bacon, Needham Heights, MA (1995)
17. Steffens, K.: Self-regulated learning in technology-enhanced learning environments: lessons of a european peer review. *European Journal of Education - Research, Development and Policies* 41(3-4), 352–379 (2006)
18. Zimmerman, B.J.: Attaining self-regulation: A social cognitive perspective. In: Boekaerts, M., Pintrich, P.R., Zeidner, M. (eds.) *Handbook of Self-Regulation*, pp. 14–39. Academic Press, San Diego, CA (2000)