Promoting cooperative skills within mixed-ability groups using interdependent rewards

تعزيز المهارات التعاونية ضمن مجموعات مختلطة القدرات باستخدام مكافآت مترابطة

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- **Abstract :** With the growing interest to incorporate cooperative learning in higher education as a method of more opportunities, motivating students of different abilities to really cooperate is becoming one of the major challenges. In many cooperative groups, there are dominators and/or free riders. This limits groupmates' interdependence or, even worse, creates negative interdependence among them. Therefore, it becomes very crucial for university teachers, who are wishing to implement formal cooperative learning, to establish the educational as well as the social environment that helps students with different abilities to develop their interpersonal skills necessary to cooperate effectively. The current study straddles the social motivational and social cohesion perspectives on cooperative learning. It aims at investigating the comparative impact of two different reward pedagogies on the development of interpersonal cooperative skills within mixed-ability groups. The study was conducted with thirty-nine EFL students arrayed into heterogeneous level teams that engaged in Group Investigation method within an Algerian university context. While task interdependence was symmetrically established in the two experimental groups, reward interdependence was manipulated over two levels: interdependent-shared reward pedagogy and interdependent-individualistic reward

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pedagogy. T-test results of a self-report cooperative skills scale supported the hypothesis; Interdependent-individualistic reward pedagogy better promoted cooperative skills than did interdependent-shared reward pedagogy.

-Keywords: Cooperative learning – interpersonal skills – interdependence – reward.

- **الملخص:** مع تزايد الاهتمام بدمج التعلم التعاوني في التعليم العالي كوسيلة لمزيد من الفرص، أصبح تحفيز الطلاب ذوي القدرات المختلفة على التعاون حقا أحد التحديات الرئيسية. في العديد من المجموعات التعاونية يكون أعضاء المجموعة اما مهيمنين او غير مبالين مما يحد من ترابطهم او حتى يخلق ترابطا سلبيا بينهم. لذلك أصبح من المهم جدا لأساتذة الجامعة الذين يرغبون في دمج التعلم التعاوني انشاء البيئة التعليمية وكذلك الاجتماعية التي تساعد الطلاب ذوي القدرات المختلفة على تطوير مهاراتهم الاجتماعية الضرورية للتعاون بشكل فعال. الدراسة الحالية تمتد عبر التحفيز الاجتماعي والتماسك الاجتماعي في التعلم التعاوني وتهدف الى التحقيق في التأثير المقارن لطريقتين من طرق المكافأة على تطوير المهارات الاجتماعية التعاونية بين الافراد داخل المجموعات ذات القدرات المختلطة. اجريت الدراسة مع 39 طالبا من طلاب اللغة الإنجليزية الذين تم تقسيمهم الى مجموعات ذات قدرات مختلطة درست بطريقة المشروع الجماعي ضمن سياق جامعي جزائري. في حين تم تأسيس الترابط بين المهام بشكل متماثل في المجموعتين التجريبيتين تم التلاعب بترابط المكافأة على مستويين: المكافأة المترابطة الفردية والمكافأة المترابطة المشتركة. نتائج مقياس التقرير الذاتي للمهارات التعاونية دعمت الفرضية: طريقة المكافآت المترابطة الفردية عززت المهارات التعاونية بشكل أفضل من طريقة المكافآت المترابطة المشتركة.

- **الكلمات المفتاحية** التعلم التعاوني - المهارات الاجتماعية - الاعتماد المتبادل – المكافأة.

- Introduction:

School is the place where learners develop not only intellectually but also socially, by interacting with people around them, sharing their knowledge and experiences, and learning how to communicate with others. Contrary to chomskyan theory that viewed learning as an individual activity, social constructivist theory considers learning as a social-embedded activity (Ellis, 1999; McGregor, 1992). Because the role of college is to prepare students for real world, learning groups, as a small miniature of the social system, can be very effective for doing so. Fiechtner and Davis (1992) view group learning as "an attempt to introduce students to real-world

experiences before graduation" (p. 86). Cooperative learning is one of the promising methods that provide comfortable contexts for social interaction. Such contexts are found to be very effective in reducing anxiety, promoting learning with understanding, and fostering conceptual change (Brown & Palincsar, 1989; Johnson, Johnson & Smith, 2013). In the process, students are sharing ideas, checking understanding, explaining, helping, encouraging, and doing myriad of activities as well as developing their feelings and attitudes towards their groupmates. Smith and McGregor (1992) consider cooperative learning as a turning point in higher education that shifts the paradigm from a prevailing pedagogy of lectures and routinized tests to active learning, where social and intellectual engagement is necessary.

As a matter of fact, university students are diverse in terms of background, experience, and skills. These differences may affect the way they get along with each other and across their learning. Arguably, students need to develop their intellectual as well as their social skills to succeed as college students. Therefore, it becomes very necessary to establish the educational and social environment that helps students with different abilities to develop the knowledge, skills, and attitudes required to interact and work together (Cohen, Brody & Shevin, 2004).

Research on cooperative learning has moved beyond studying the effectiveness of cooperative learning over traditional methods to investigate the conditions under which this promising method works better. Motivating students to cooperate has been an area of debate over the last decade. While social interdependence theory stresses mainly intrinsic motivation (Johnson & Johnson, 2003), behavioural learning theory assumes that cooperative efforts are powered by extrinsic motivation (Johnson et al., 2000). On another hand, Kohn (1991) believes that extrinsic motivation can be counterproductive and may undermine intrinsic motivation. However, Ryan and Deci (2000) explain that this undermining effect depends on students' perceptions of the reward whether informational or controlling. In the same vein, the social cohesion perspective on cooperative learning tends to reject extrinsic motivation while

emphasizing group cohesion that can be established through task/resource interdependence, team-building, and group processing (Sharan & Sharan, 1992). Whereas, motivational theorists on cooperative learning (e.g., Kagan, 1985; Slavin, 1995; Farmer, 1999; McConnell, 2013) point to the significance of extrinsic rewards in linking groupmates' goals and promoting cohesiveness and achievement. According to the motivationalists, extrinsic motivation affects interpersonal goal structures, which in turn affect groupmates' interdependence (Forman & McPhail, 1993). The latter position has been advocated by more recent researchers (e.g., Buchs et al., 2011; Bear et al., 2016; Wah & Sim, 2019) adopting a different approach from whether to reward or not, to address the question of what reward structure is more effective.

The most common ways for rewarding group work are either to reward individual performances or the group product. Each of these rewards is a sword with two edges; Slavin (1996) points to the dominance and social loafing effects resulting from these reward structures. According to him, individual reward structure makes each member responsible for his part, but, results in the diffusion of responsibility where members of the group dominate the work and exclude the perceived less able ones. On another hand, Group product reward structure results in free-riding where some members rely on the others to accomplish the task. Recognizing the potential pitfalls of using either purely individual or group rewards, Slavin (1996) suggest a group reward structure based on the average performance of the groupmates. This cooperative (interdependent and shared) reward structure links groupmates' goals so that no one can succeed unless the others do (Slavin, Hurley and Chamberlain, 2003). However, Johnson, Hollenbeck, Humphrey, Ilgen and Meyer (2006) found that purely cooperative (shared) reward structure results also in some pitfalls. According to them, students who are used to competitive reward structure are not able to cope with the change toward cooperative reward structure. To resolve the trade-offs between rewards, Johnson et al. (2006) suggest a hybrid reward structure (interdependent but individualistic) that emphasizes both individual- and team-level performance. In this

structure, reward is made of two parts: the first portion is individualistic and the second is cooperative (the average of groupmates' performances). Interdependent-individualistic reward structure stimulates both individual efforts and group cohesion. Such structure allows for directing teammates' attention and motivation toward their own and their group responsibilities (Pearsall, Christian & Ellis, 2010). The difference with interdependent-shared reward pedagogy is that interdependent-individualistic reward pedagogy is a combination of the individual score and the groupmates' average score. In this sense, members of the group receive different rewards depending on 1- their individual efforts and 2- their cohesiveness.

The current study straddles the social motivational and social cohesion positions by using aspects of both perspectives. First, task interdependence is similarly well established in the two experimental conditions. In addition to this, teambuilding and group processing were incorporated as held essential by the social cohesion perspective. Next, different reward pedagogies (interdependent-shared and interdependent-individualistic) were manipulated to investigate their effects on the development of cooperative interpersonal skills. Based on Slavin (1996)'s and Johnson et al. (2006)'s multilevel theories of group contingencies as an explanatory framework, this study examined how these two types of reward differentially influence the development of cooperative interpersonal skills in actual classroom settings.

Hypothesis: interdependent-individualistic reward pedagogy will better promote cooperative interpersonal skills compared to interdependent-shared reward pedagogy.

1- Interpersonal skills in cooperative learning:

Social skills are a key component not only in the success of peer relationships but also in academic success (Carter & Hughes, 2009). Cooperative learning, with its emphasis on individual accountability and positive interdependence, is intellectually and socially involving students. In their cooperation, students are exchanging

information, sharing ideas, using each other's resources, and coordinating their efforts to maximize their productivity and achievement. They also benefit from their groupmates' modelling effective behaviours, skills, and attitudes (Johnson et al., 2013). Engaging in such ways of elaboration and restructuring of the information leads to conceptual change, and all meaningful conceptual change is self-directed learning (Brown & Palincsar, 1989).

Cooperative learning promotes greater interpersonal attraction and more positive relationships among students than do competitive and individualistic learning. It creates strong feelings that groupmates like, support, and accept each other. It also makes students caring about how much their groupmates learn and helping each other to learn (Johnson & Johnson, 1985). Kagan (1985), also, argue that cooperative learning promotes positive social relations and prosocial development. In addition to these positive feelings and attitudes, working cooperatively provides students opportunities to discuss the content with their peers who are close to their level of understanding (Slavin & Madden, 2001).

Being so, cooperative learning is an effective strategy that provides opportunities for peer interaction resulting in more moderated interpersonal skills. According to the social cohesion perspective, the development of interpersonal skills is determined by the group cohesion (Sharan & Sharan, 1992). However, research on cooperative learning methods based only on group cohesion theories provides inconsistent support to the idea that social cohesiveness will enhance achievement (Slavin, 1995). The social motivational perspective deems group rewards as essential to the effectiveness of cooperative learning in changing students' incentives to work together (Slavin, 1996; Slavin et al., 2003).

2- Interdependence and rewards:

Research on classroom interaction becomes more interested in the way goals are formed and changed in relation to working with particular people in particular circumstances (Jacobs, McCafferty & Iddings, 2006). Building on Deutsch theorizing,

goal structures can be: (a) cooperative, where each individual's goal-oriented efforts contribute to others' goal attainment; (b) competitive, where each individual's goal-oriented efforts discourage other's goal attainment; or (c) individualistic, where individual's goal-oriented efforts have no impact on other's goal attainment (Slavin, 1996). The way people believe their goals are related determines their interaction which in turn affects their performance and cohesiveness (Beersma et al., 2003). That is, positive interdependence leads to cooperation and results in promotive interaction as individuals encourage and facilitate each other's efforts to learn. While negative interdependence leads to competition and typically results in oppositional interaction as individuals discourage and obstruct each other's efforts to achieve. In the absence of a functional interdependence, there is no interaction as individuals work independently without interchange with each other (Johnson et al., 2000). According to the social motivational perspective, rewards create positive interdependence among group members. The fact that the whole group will be rewarded motivates students to work together and help each other (O'Donnell, 2012).

Individualistic and competitive grading in traditional classrooms create peer norms that oppose academic efforts. Such reward structures limit the group interaction and, even worse, may lead to contrient interaction where groupmates obstruct the progress of each other to reach their individual goals at the expense of others because one student's success decreases the chances that others will succeed (Johnson et al., 2006). In contrast, group contingencies theory requires students to engage in behaviours that help the group to be rewarded since their outcomes are dependent on one another's behaviours (Slavin et al., 2003). In the same vein, behavioural learning theory highlights the impact of group rewards and reinforces on learning. The theory assumes that cooperative efforts are powered by extrinsic motivation to achieve group rewards (Johnson et al., 2000; Johnson & Johnson, 2005). Moreover, social interdependence theory holds that cooperative reward structures encourage promotive interaction and mutual help to reach the group goals.

Consequently, all the members benefit from each other's experience (Johnson et al., 2006).

Group rewards based on the individual learning of all the members are found to be effective in encouraging students to engage in cooperative behaviours (Slavin, 1995). According to the motivationalists, such cooperative incentive structure links groupmates' goals so that no one can succeed unless the others do. Since their goals are dependent on each other's behaviour, groupmates will be motivated to help each other to achieve them, and this process creates an interpersonal reward structure. The rationale behind interdependent rewards is that if students value the success of the group, they will encourage and help one another to achieve better outcomes (Slavin et al., 2003)

3- Method:

The current research uses a comparative experimental design conducted to investigate the comparative impact of two reward pedagogies on students' cooperative skills. It involves two experimental groups with different interventions. It uses a pre-test-post-test design to measure changes in individuals' cooperative skills in the two experimental groups.

3.1- Sample:

Participants included thirty-nine first year EFL students at Barika university centre (2/3 the total number). Participants were divided into two groups which were randomly assigned to the two experimental conditions: Interdependent-individualistic reward pedagogy including 19 participants, and interdependent-shared reward pedagogy including 20 participants, under which they operated in three phases (pre-, during, and post-experiment). Using random stratified selection based on students' oral proficiency level, participants were arrayed into four-person heterogeneous level teams, with the exception of one team in the interdependent-individualistic reward condition that consisted of only three members. The aim from this grouping was to achieve intra-groups heterogeneity and inter-groups homogeneity.

3.2- Task structure and task interdependence:

The adapted Group Investigation method is a project-based form of cooperative learning. Participants engaged in group projects adapted from Interchange (see Richards, Hull, Proctor, & Bohlke, 2012). Throughout their investigation, participants engaged in a series of sequential stages including planning for their investigation, collecting and preparing information, discussing and integrating their findings, and finally presenting their work to the whole class. The projects were adapted to facilitate task division and to establish resource interdependence among teammates.

3.3- Manipulated reward structure:

While task interdependence was symmetrically established in the two experimental groups, reward interdependence was manipulated over two levels: interdependent-shared and interdependent-individualistic reward pedagogies. Teams in the interdependent-shared reward pedagogy were asked to work together to accomplish group projects in which their final performances would be individually assessed. The average of their individual performances formed the final grade which was shared among the groupmates. Whereas, teams under the interdependent-individualistic reward condition operated under a reward structure with both individual and group aspects. Like participants in the interdependent-shared reward condition, they were asked to work together to complete group projects, and they were told that their performances would be individually assessed. The final grades, however, were a combination of their individual performances (50%) and the average performance of the group (50%). While interdependent-shared reward pedagogy emphasizes team-level performance, interdependent-individualistic reward pedagogy stresses both individual- and team-level performances.

3.4- Procedure:

Prior to the experiment, setting the ground for cooperative learning implementation was essential. The starting point was team formation. Participants have been grouped into mixed-level foursomes based on an oral proficiency test. Each

group comprised high and low achievers. To facilitate their communication, participants' seats have been arranged; each member sits next to or in front of another teammate of a closer level (Kagan & Kagan, 2009). The next step in cooperative learning implementation was teambuilding. The aim from this procedure was to create a sense of cohesiveness among teammates necessary for their cooperation.

After this preliminary stage, in which teammates got acquainted with each other and familiarized with the required cooperative skills, the experiment started. The latter operated in three main phases: before, during, and after the experiment. In the pre-experimental phase, teams in the two conditions worked under the same task structure without rewards. By the end of the first project, a self-report measure was administered to collect data about participants' interpersonal cooperative skills. Immediately in the next phase, participants engaged in group projects with both task and reward aspects. Teams in the two conditions worked under the same task structure, but with different reward pedagogies; teams in experimental group one operated under interdependent-individualistic reward pedagogy, and teams in experimental group two operated under interdependent-shared reward pedagogy. Data about the development of their cooperative skills have been collected in the last phase using the same measure.

3.5- Tools:

To examine the effectiveness of the rewards manipulated in promoting cooperative skills, a Self-Report Cooperative Skills Scale (SRCSS) was used. The latter is a five-point Likert scale that consists of 20 items. It deals with participants' perceptions, feelings, attitudes, and prosocial behaviours (e.g., "I appreciate my groupmates' efforts", "I feel that I am part of my group", "To what extant do you trust your groupmates?", "How often do you check your groupmates' understanding?"). According to Lorr, Youniss, and Stefic (1991), interpersonal skills are not only behaviours. They are also attitudes, perceptions, and feelings which are related to the way a person behaves.

The SRCSS was developed by the researchers themselves after an extensive literature review which did not locate any existing interpersonal cooperative skills measures suitable for the purpose of this research. Cronbach's alpha coefficient (0.809) showed satisfactory internal consistency reliability.

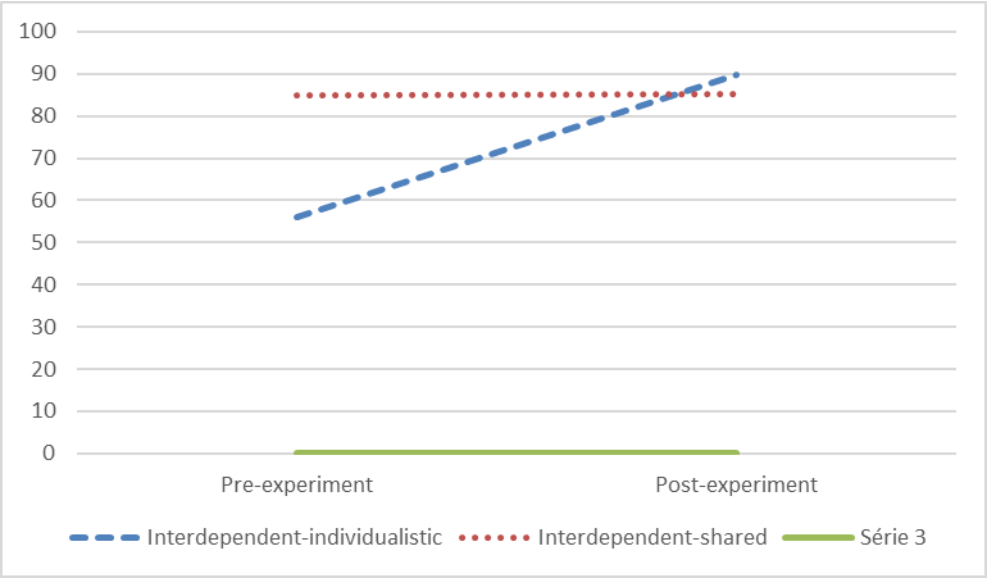
4- Results:

Means and standard deviations for pre- and post-test, mean difference from pre- to post-test, and alpha values of paired sample t-tests for each group are included in the table below:

Table N°1. Total results of the SRCSS

Group	Pre/Post	Mean	S.D.	Mean difference	t	Sig. t-test
Interdependent-individualistic	Pre	55.8947	6.22624	33.84211	15.340	0.000
	Post	89.7368	6.70690			
Interedependent-shared	Pre	84.8571	6.77706	0.42857	0.179	0.859
	Post	85.2857	7.23286			

The results demonstrate that teams operating under the interdependent-individualistic reward condition [t=15.340, p<0.0005] significantly increased from pre- to post-test while teams working under the interdependent-shared reward condition [t=0.179, p=0.859] did not. The mean plots (see the graph bellow) display a clear difference in the magnitude development of cooperative skills in favour of interdependent-individualistic reward condition. This indicates that group one improved considerably while group two did not. These results support the assumption that interdependent-individualistic reward pedagogy better promotes cooperative skills than does interdependent-shared reward pedagogy.



Gragh N° 1. Development of cooperative skills

5- Discussion:

The current study was conducted to examine the effectiveness of different reward pedagogies on the development of interpersonal cooperative skills within mixed-ability groups. As expected, the two reward pedagogies affected differently students' prosocial skills. The study hypothesis was supported; Among the two reward conditions, students responded better to the interdependent-individualistic reward pedagogy.

Previous studies investigated the effectiveness of cooperative (interdependent) rewards over individualistic (independent) rewards in promoting interpersonal skills. For instance, Slavin (1980) and Mevarech, Stern, and Levita (1987) found that cooperative reward structure is more positively related to social bounding. Further research (e.g., Mizuhara & Tamai, 1952; Phillips & D'Amico, 1956; Raven & Eachus, 1963), also, revealed that group rewards were more effective than individual rewards in promoting friendship and help among group members. More recent researchers were more interested in investigating the interaction between task interdependence and reward interdependence. For instance, Brewer and Klein (2006) found that task

interdependence combined with reward interdependence were more effective in promoting interaction than did separate structures. However, Buchs et al. (2011) found that the effectiveness of reward interdependence is more obvious in the absence of task interdependence. That is, with the presence of task interdependence, independent and interdependent reward structures functioned similarly.

The present experiment manipulates reward interdependence in the presence of task interdependence. Two different interdependent reward pedagogies (interdependent-shared and interdependent-individualistic), which were used to promote cooperative skills, revealed different effects. Strong support to the hypothesis that interdependent-individualistic reward pedagogy is more effective than interdependent-shared reward pedagogy. This finding corroborates previous research (e.g., Wah & Sim, 2019) indicating that cooperative-individualistic rewards are much more effective than only cooperative in promoting prosocial behaviours.

Although the two reward pedagogies are both interdependent, the research findings show that students responded better to the reward pedagogy that preserves the difference in achievement levels. In a relevant study, Johnson et al. (2006) found that it is easier to shift from cooperation to competition than from competition to cooperation. Accordingly, students who were used to competitive grading and care about their ranks find difficulties in changing toward purely cooperative grading and accepting equalization in varied-effort groups.

While interdependent rewards are supposed to link groupmates' goals and encourage cooperativeness, this study reveals that the development of cooperative interpersonal skills is much more affected by their perceptions and feelings toward their teammates and the reward pedagogy as such. The way students perceived each other's impact on the reception of rewards determined their attitudes and, therefore, their prosocial behaviours. According to Johnson, Johnson, Jhonson, and Anderson (1976), people tend to like and help those who facilitate the reception of their rewards. In the same vein, Wah and Sim (2019) assert that mutual liking is crucial in

promoting cooperativeness and developing prosocial behaviour. Hence, Interdependent-individualistic reward pedagogy, with its emphasis on joint efforts while preserving individual's achievement level, better links teammates' goals and creates positive feelings and attitudes toward each other which, in turn, promotes cooperative skills.

6- Conclusion:

The present study is a quasi-experiment, therefore, a possibility that the outcomes of the study were influenced by factors outside the study is to be recognized; Notably, students' past experiences with reward pedagogies. To some extent, the current study contributes in putting bed the question of whether to reward or not, and focusing, instead, on the types of rewards that work better. On the whole, it is reasonable from this study to advance cooperative-individualistic reward pedagogy as a way forward to foster cooperative skills at least for first year English students at Barika university centre. Generalizing the results to other educational levels or settings remains an open question. Thus, replication of the present study across other sample characteristics is clearly warranted.

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