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Interactions and Relationships Between Teacher's Weaving Postures and Students' Study Postures According to ICHC-M_{GK} at the Bourbon College, La Réunion

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Abstract: This study aims to explore the relationships between students and the teacher during mathematics learning sessions, more precisely when solving proportionality problems in the third grade class at the Bourbon College, located on the island of La Réunion, France. The main objective is to examine the links between the weaving postures adopted by the teacher and the students'study postures, based on the theories developed by Bucheton and Soulé (2009). These postures play a key role because they structure the classroom environment and directly influence students' engagement and understanding. For this study, video sequences, with a total duration of 256 minutes, were recorded in order to observe classroom interactions. These videos were cut into sequences of two minutes each (i.e. 128 sequences in total). The collected data were then analyzed using the theory of Implicative Statistical Analysis (ISA), an asymmetric analysis method that crosses subjects or objects with variables of different types, here of the Boolean type. The extension technique of the Implicative and Cohesive Hierarchical Classification (ICHC), called ICHC based on Measure Guillaume-Kenchaff (M_{GK}), was used for data exploration and analysis. This method makes it possible to address the numerical and graphical issues associated with the ASI, and to classify the valid M_{GK} rules according to the cohesion index, in order to extract meta-rules facilitating the interpretation of the results. The results show that when the teacher establishes connections between the knowledge taught, the students adopt a school posture favorable to the assimilation of knowledge. However, in this study, it appears that weaving postures are little used by the teacher, with less than 20% frequency of occurrence, which limits the links between the teacher's weaving postures and the students' study postures, while these interactions are essential to academic success. By better understanding the individual and collective needs of students, teachers can adjust their teaching methods to create a learning environment more conducive to the success of all. Such an adaptation, taking into account the specificities of each learning context, could significantly improve academic results as well as students' engagement in their learning of mathematics.

Keywords: Weaving Posture, Study Posture, Proportionality, Interaction, $ICHC - M_{GK}$

1. Introduction

Mathematics encompasses a set of abstract knowledge resulting from logical reasoning applied to various concepts such as mathematical sets, numbers, shapes, structures, transformations, and many others. It plays a vital role in understanding how the world works and in supporting other sciences such as physics, chemistry, informatics, geography? Researchers use it to develop technological innovations that revolutionize our lives, ranging from advances in the internet to means of transportation such as airplanes and rockets. In short, mathematics is a crucial discipline that students must master. However, despite its importance, students' skills in mathematics, in particular, tend to weaken in general. For example, in Europe, France is often cited among the worst performers in mathematics. According to the 2019 Trends in International Mathematics and Science Study (TIMSS) survey, the mathematical skills of French students show a worrying trend.

A report submitted in March 2022, commissioned by the Ministry of National Education and Youth in France, highlights the continued deterioration in the average level of mathematics skills over the last 40 years. In addition, the results of the PISA (Programme for International Student Assessment) survey show a clear decline in mathematics performance in France[1]. These findings also apply to French-speaking countries in the Indian Ocean, such as the island of La Réunion.

With a view to improving the quality of teaching, researchers have looked at the impact of the teacher's body. Their attention has focused on the study of gestures and postures adopted in the classroom. Considered as a pedagogical instrument, the teacher's body plays an essential role in the transmission of knowledge, just like the voice [2, 5, 8, 10]. In this perspective, Tellier recommended that teachers learn to use their body to support the students' learning process, given that the gestures deployed in the classroom generally have a pedagogical dimension [17]. According to him, these gestures can be grouped into three main functions in the language classroom: informing, evaluating and facilitating. Thus, the gesture acts as a non-verbal translation of the teacher's speech, facilitating the understanding of the words spoken by the learners. It is considered a pedagogical practice, acting as a facilitator for access to meaning and memorization [18].

Therefore, gestures are established as a means of communication, used to transmit the message to learners [8]. In parallel, Bucheton and Soulé synthesized the Interdisciplinary Research Laboratory in Didactics, Education and Training (IRLDET) research work [2]on teacher behavior in the classroom [3]. Their goal is to facilitate the understanding of teachers' professional gestures in order to adapt to the diversity of variables present in any situation: time management, interactions, knowledge, tasks, relationship to knowledge, student attitudes, artifacts, etc. Their work aims to account for how different configurations of gestures and postures can generate various cognitive and relational dynamics in the classroom. Thus, they validated their hypotheses on the reciprocal adjustment of teachers and students postures. As the students' levels in mathematics are well below average, it is important to help them with the help of weaving postures which are to connect the outside and the inside of the classroom, the current task with the one that precedes or follows, the beginning with the end of the lesson. However, questions persist about the links between weaving postures and students' study postures in the context of teaching mathematics.

In order to explore this issue further, we undertook an in-depth analysis of the practice of teaching mathematics in the Bourbon secondary school on Reunion Island. Teaching sessions were filmed, including sessions on solving proportionality problems in the 3rd grade. The main objective of this study is to establish and understand the links and relationships between weaving postures and students' study postures when teaching mathematics on solving proportionality problems, in the 3rd grade of the Bourbon college on Reunion Island with the aim of improving the level of students in this discipline. To do this, we will proceed to the exploitation of the videos of teaching sessions filmed in this class. All the postures of the teacher's weaving and the postures of students detected in the video sequences are noted in our observation grid drawn from the grid of HellaFeki et al [3]. The data collected will be analyzed later using the Implicative Statistical Analysis method according to the M_{GK} measure ($ISA - M_{GK}$) implemented in the Implicative and Cohesive Hierarchical Classification ($ICHC - M_{GK}$) software, to facilitate the interpretation of the results. This will allow us to open discussions.

2. Tools and Methods

2.1. Tools Used

The study was conducted in a 3rd grade class at the Bourbon middle school on the island of La Réunion, France. The class had 24 students. Only one teacher was observed during four sessions devoted to teaching mathematics, more specifically to solving proportionality problems.

The theory developed by Bucheton and Soulé particularly with regard to weaving postures, brings meaning to learning [3]. It allows us to take stock of what we have learned and to determine the areas that need to be worked on. Weaving can also be done in collaboration with another discipline (interdisciplinary weaving) or in a context outside the school,

[1] https://www.education.gouv.fr/pisa-2022-la-france-ne-fait-pas-exception-la-baisse-generalisee-des-performances-en-culture-380205

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for example, during daily cultural activities (non-disciplinary weaving) [4]. The weaving posture is an articulation between the different units of the lesson. It is a linking operation that the teacher opportunely does (Tiss_1,. . ., Tiss_4):

1. *$Tiss_1$:* Giving meaning to the knowledge sought
2. *$Tiss_2$:* Making sense of the situation
3. *$Tiss_3$:* Making connections between targeted knowledge
4. *$Tiss_4$:* Making connections between situations.

There are also six possible postures among the students (Pel_1, . . . ,Pel_6), in response to the postures teacher :

1. *Pel_1*: school posture characterizes more the way in which the student tries above all to return within the expected academic standards, tries to fit into the expectations of his teacher.
2. *Pel_2*: the first posture describes the way in which the students launch into the task without too much think, letting all kinds of ideas or solutions manifest without returning to them further.
3. *Pel_3*: the playful-creative posture reflects here that the student uses creativity to reinvent the task which was entrusted to him.
4. *Pel_4*: the reflective posture is one which allows the student not only to be in action but to to return to this action, to " secondarize" it to understand its purposes, the failures, the contributions.
5. *Pel_5*: the posture of refusal designates refusal to do, to learn, refusal to conform is always a indicator to be taken very seriously. It often leads to identity and psycho-affective problems, to symbolic or real violence suffered by students.
6. *Pel_6*: The dogmatic posture manifests an asserted non-curiosity. The "I already know", the "former my master, my mother, etc. have already told me". The students are not actors in this case of this that they learn.

From the beginning of the research until the results were obtained, videos were first recorded during the teaching sessions, then YouTube was used to transcribe the teacher's words. Subsequently, these transcriptions were transferred to Excel, integrating line by line the 256 minutes of videos, cut into sequences of two minutes each (i.e. 128 sequences).

Table 1. *Extract from the binary table.*

Sequence	Tiss_1	Tiss_2	Tiss_3	Tiss_4	School (Pel_1)	First do(Pel_2)	Creative (Pel_3)	Reflective (Pel_4)	Refusal (Pel_5)	Dogmatic (Pel_6)
Seq1	0	0	0	0	1	0	0	1	0	0
Seq2	0	1	0	0	1	1	0	0	0	0
Seq3	0	0	0	0	1	1	0	1	0	1
	.	.	.	.	.	.	.	.	.	.
	.	.	.	.	.	.	.	.	.	.
	.	.	.	.	.	.	.	.	.	.
Seq126	0	0	0	0	0	1	0	0	0	0
Seq127	0	0	0	0	1	1	0	0	0	0
Seq128	0	0	0	0	0	1	0	1	0	0

The postures of the teacher's weaving and the postures of the students'study detected during all the sessions of the teaching previously mentioned in the videos are noted in order to be able to create the observation grid. To obtain a table in the form of a binary context (Cf.Table 1), we chose to characterize by "1" the presence of postures in the 128 video sequences and by "0" its absence. Finally, we transported the data collected to the $ICHC - M_{GK}$ software to analyze the results.

2.2. Methods

The data collected is studied using the theory of Implicative Statistical Analysis (ISA), which is a non-symmetrical method of analyzing data crossing subjects or objects with variables of different types (In this case, a Boolean type is used) [6]. The technique of extending the Implicative and Cohesive Hierarchical Classification - $ICHC$ [7, 15, 19] called Implicative and Cohesive Hierarchical Classification based on $\text{M}_{GK}(ICHC - M_{GK})$ [11] is applied to the mining and analysis of this data collected to deal with the numerical and graphic problems necessary for the use of the ISA. This application is also used to classify M_{GK} rules - valid according to the cohesion index based on M_{GK} in order to obtain metarules to facilitate interpretations of the analysis results [13]. Let ($\mathbb{K}$, $\mathcal{S}$, $\mathcal{P}$) be a binary context. Consider a set of sequence $\mathcal{S} = \{\text{seq}_1, \text{seq}_2, \ldots, \text{seq}_{128}\}$ and a set of items (Postures) $\mathcal{P} = \{\text{Tiss}_1, \text{Tiss}_2, \text{Tiss}_3, \text{Tis}_4, \text{Pel}_1, \text{Pel}_2, \ldots, \text{Pel}_6\}$ (Cf.Table 1). The association rule between two Boolean variables is defined by the analysis of the contingency table constructed by crossing them (Cf. Table 2) and the probabilities associated with the contingency table are shown in the table 3.

Table 2. *Contingency table.*

	B	$\overline{B}$	$\sum$
A	n_{AB}	$n_{A\overline{B}}$	n_A
$\overline{A}$	$n_{\overline{A}B}$	$n_{\overline{A}\,\overline{B}}$	$n_{\overline{A}}$
$\sum$	n_B	$n_{\overline{B}}$	n

Table 3. *Probabilities associated with the contingency table.*

	B'	$\overline{B'}$	$\sum$
A'	$P(A' \cap B')$	$P(A' \cap \overline{B'})$	$P(A')$
$\overline{A'}$	$P(\overline{A'} \cap B')$	$P(\overline{A'} \cap \overline{B'})$	$P(\overline{A'})$
$\sum$	$P(B')$	$P(\overline{B'})$	$\frac{Card(\mathcal{S})}{n} = 1$

Mathematical modeling: consider a finite discrete probability space ($\mathcal{S}$,$\mathcal{P}(\mathcal{S})$,P) such that for any event X of $\mathcal{P}(\mathcal{S})$, $P(X) = \frac{card(X)}{card(\mathcal{S})}$. The set of n sequences on which m random variables of Bernoulli have been measured. Let $\mathcal{I}$ represent the set of items, defined as $\mathcal{I} = \{i_1, i_2, i_3, \ldots, i_n\}$. For all $X \in \mathcal{P}(\mathcal{I}) \setminus \{\varnothing;\mathcal{I}\}$, for all $x_i \in X$, x_i is an application from $\mathcal{S}$ to $\{0;1\}$ and $P(x_i = 1) = \frac{(card(x_i^{-1}(1)))}{n}$, with $n = card(\mathcal{S})$. Any non-empty part of $\mathcal{I}$ will be called an $\mathcal{I}$ pattern. Then for A pattern, $A' = A^{-1}(1)$ and $n_A = card(A')$. For A and B patterns, $n_{AB} = card(A' \cap B')$ the number of transactions that realize both A and B. Let $\overline{A} = \mathcal{I} - A$ be the logical negation of a pattern A. The real number $P(A')$ will be called the *support* of the pattern A denoted $supp(A) = \frac{card(A')}{n}$[1].

An interestingness probabilistic measure is a real function μ of $\mathcal{P}(\mathcal{I}) \times \mathcal{P}(\mathcal{I})$ such that for any association rule $A \to B$, the value of $A \cap B = \oslash, \mu(A \to B)$ is calculated from the four quantities $n = card(\mathcal{S})$, $P(A')$, $P(B')$ and $P(A' \cap B') = supp(A \cup B)$. Finally, for two patterns (or items) A and B of a binary context, the interestingness measure M_{GK} is defined by: $M_{GK}(A \to B) =$

$$\begin{cases} M^f_{GK}(A \to B) = \frac{P(B'/A') - P(B')}{1 - P(B')}, \text{if A favors B ;} \\ 0 \qquad , \text{if A and B are independant;} \\ M^d_{GK}(A \to B) = \frac{P(B'/A') - P(B')}{P(B')}, \text{if A disfavors B} \end{cases}$$

The theoretical work published with Rakotomalala and al. allowed us to develop an algorithm for extracting M_{GK}-valid association rules [12–14].

1. The extraction of the association rules is based on the interestingness measure M_{GK} compared to the relation two by two of the variables according to contingency tables; and the validation of the extracted rules is done in relation to the favoring component M^f_{GK} which is implicative and the critical value $M^f_{GK(\alpha)}$ having a relation with the χ^2 of degree of freedom 1 at the risk threshold a chosen by ourselves such as $M^f_{GK} > M^f_{GK(\alpha)}$ with $M^f_{GK(\alpha)} = \sqrt{\frac{1}{n}\frac{n - n_A}{n_B}\frac{n_B}{n - n_B}\chi^2_{\text{Theoritical}(\alpha)}}$. In this article, $\alpha = 10\%$, ones ponding to $\chi^2 = 2.7$;
2. The value of support according to M^f_{GK} such as $supp_{M^f_{GK}}(A \to B) = supp(A) * \left[(1 - supp(B))M^f_{GK}(A \to B) + supp(B)\right]$ is generally seems low [14]. It is therefore essential to normalize this value to contrast it [13], denoting it as $supp^f_{(n)M_{GK}}$:

$$supp^f_{(n)M_{GK}}(A \to B) = \frac{supp_{M^f_{GK}}(A \to B) - P(A')P(B')}{P(A')(1 - P(B'))}$$

3. The value of $supp^f_{(n)M_{GK}} \in]0.5, 1]$ allows us to establish the value of the cohesion between two items, denoted $coh_{supp_{(n)M_{GK}}}$ with [13]:

$$coh_{supp_{(n)M_{GK}}}(A, B) =$$
$$\begin{cases} \sqrt{1 - (supp^f_{(n)M_{GK}}(A \to B))^2}, \text{if } supp^f_{(n)M_{GK}(A \to B) > 0,5} \\ 0 \qquad , \text{if } supp^f_{(n)M_{GK}(A \to B) \leq 0,5} \\ 1 \qquad , \text{if } supp^f_{(n)M_{GK}(A \to B) = 1} \end{cases}$$

4. The Implicative and Cohesive Hierarchical Classification method according to the interestingness measure M_{GK} (ICHC-M_{GK}) is based on cohesion $coh_{supp_{(n)M_{GK}}}$ [12].
The data transformed into binaries of table 1 by the ICHC-M_{GK} software for analysis.

3. Results of Analysis According to $ICHC - M_{GK}$

3.1. Characteristics of Postures

Table 4 shows us that the school postures (Pel_1) and first (Pel_2) are widely used by students, with respective average rates of 81.25% and 64.84%. On the other hand, the refusal and playful-creative postures are rarely used, with respective average rates of 2.34% and 7.81%. We also note that the teacher does not like to use the weaving postures because the four weaving postures mentioned below have an average rate of less than 20%.

Table 4. *Characteristics of variables.*

Postures	$Tiss_1$	$Tiss_2$	$Tiss_3$	$Tiss_4$	School (Pel_1)	First do(Pel_2)	Creative (Pel_3)	Reflective (Pel_4)	Refusal (Pel_5)	Dogmatic (Pel_6)
Occurrence	8	16	25	21	104	83	10	36	3	25
Moyenne (%)	06.25	12.50	19.53	16.40	81.25	64.84	07.81	28.13	02.34	19.53

3.2. Results Obtained by $ICHC - M_{GK}$

To validate the implicative link between two context variables (Cf.Table 1), the independence test χ^2 was employed with a threshold $\alpha = 10\%$ (or $\chi^2 = 2.7$). A total of 16 rules were obtained as valid according to M_{GK}(Cf. Table 5):

Table 5. *Table representing standardized supports based on M_{GK}: $supp^{f}_{(n)M_{GK}}$.*

$supp^{f}_{(n)M_{GK}}$	**$Tiss_1$**	**$Tiss_2$**	**$Tiss_3$**	**$Tiss_4$**	**Pel_1**	**Pel_2**	**Pel_3**	**Pel_4**	**Pel_5**	**Pel_6**
$Tiss_1$				0.252						
$Tiss_2$										
$Tiss_3$				0.139	1					0.155
$Tiss_4$	0.086		0.172							
Pel_1			0.056							0.044
Pel_2										
Pel_3									0.078	0.254
Pel_4										0.31
Pel_5							0.277			
Pel_6			0.155		0.787		0.089	0.499		

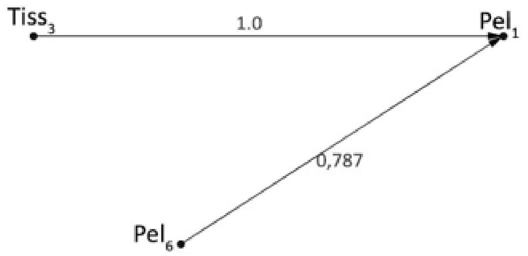

Figure 1. *Implicative graph of teacher's weaving postures and students' study postures.*

Using the normalized support values (Cf.Table 5) greater than 0.5 on the valid rules according to M_{GK}, we note the presence of a graph comprising three vertices and two edges. In particular, the vertex Pel_1 is connected to two other vertices, Tiss 3 and Pel 6, with respective M_{GK} values of 1.0 and 0.787, i.e. " The teacher who establishes links between the targeted knowledge ($Tiss_3$) and the student in a dogmatic posture (Pel_6) often has the effect of placing this student in a school posture (Pel_1) " (Cf. Figure 1).

After generating the 16 valid association rules presented in Table 5 , we calculated the cohesion between the pairs of variables associated with these rules. We found that the link between $Tiss_3$ and Pel_1 is undeniable, with a cohesion value equal to 1. On the other hand, the link between Pel_6 and Pel_1 is less strong, with a cohesion of 0.665.

Table 6. *Table representing the cohesion of pairs of variables based on $supp^{f}_{(n)M_{GK}}$: $coh_{supp_{(n)M_{GK}}}$*

$coh_{supp_{(n)M_{GK}}}$	**$Tiss_1$**	**$Tiss_2$**	**$Tiss_3$**	**$Tiss_4$**	**Pel_1**	**Pel_2**	**Pel_3**	**Pel_4**	**Pel_5**	**Pel_6**
$Tiss_1$				0						
$Tiss_2$										
$Tiss_3$				0	1					0
$Tiss_4$	0		0							
Pel_1			0							0
Pel_2										
Pel_3									0	0
Pel_4										0
Pel_5							0			
Pel_6			0		0.665		0	0		

After performing a hierarchical classification of the valid rules, we obtained the following meta-rule, presented in Table 7 and on the dendrogram of the figure 2:

($Tiss_3 \Rightarrow Pel_1$): The teacher who establishes links between the targeted knowledge often tends to place the student in a school posture.

Table 7. *Rules with inter-class cohesion, inter-class implication and significant value.*

Level	**Ruler**	**Inter-class Cohesion**	**inter-class implication**	**Significant value**
1	($Tiss_3 \Rightarrow Pel_1$)	1.0	1.0	0.02

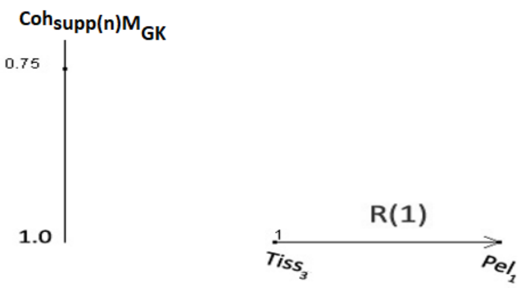

Figure 2. *Dendrogram of teacher's weaving postures and students'study postures.*

4. Discussions and Suggestions

The results of our analysis under ICHC - M_{GK} provide invaluable information on classroom dynamics and interactions between teachers and students. The high average occurrence of academic and first-doing postures among students suggests a generalized adherence to traditional learning structures, where the emphasis is on the acquisition of pre-established knowledge and skills. However, the rare use of playful-creative and refusal postures (Cf. Table 4) perhaps indicates a need to explore more varied and innovative pedagogical methods to stimulate student engagement and creativity.

The observation that teacher use of weaving postures is low (Cf. Table 4) highlights the importance of reflecting on how pedagogical practices are implemented in the classroom. Weaving postures can play a crucial role in creating connections between different concepts and in constructing meanings for students [3]. Their underuse could indicate a lack of familiarity or training of teachers in integrating these techniques into their teaching. It may be useful to explore ways to support teachers in adopting these practices, perhaps through professional development programs or additional educational resources.

The graph highlighted in our analysis (see Figure 1), relating $Tiss_3$ and Pel_1, suggests a significant relationship between the ability to establish links between the targeted knowledge and the placement of students in academic posture. This raises questions about how the structure and presentation of pedagogical content influence students' behaviors in the classroom. It would be beneficial to explore this relationship further to understand how pedagogical practices can be adjusted to promote more varied and inclusive learning postures.

The meta-rule derived from our analyses highlights the importance of teachers' pedagogical choices in promoting certain learning postures in students. This finding suggests that the teacher who emphasizes creating links between the targeted knowledge tends to promote the adoption of academic postures by students. This observation can serve as a starting point for discussions on how to adapt teaching practices to meet the varied needs and learning styles of students. Since there is only one meta-rule obtained on the data analysis, this shows that the teacher does not use many weaving postures, yet these postures are very important for student success.

5. Conclusion and Perspectives

In this study, we examined the importance of mathematics in education and understanding the world, as well as the challenges encountered in teaching this discipline. Despite their crucial role, students' mathematical skills in France and French-speaking countries of the Indian Ocean show worrying downward trends, which raises concerns about the quality of teaching. In light of this observation, our study focused on an innovative approach consisting of analyzing teacher and student postures during mathematics lessons focused on solving proportionality problems in 3rd grade at the Bourbon college on the island of La Réunion.

After analyzing the videos, which were segmented into 128 sequences, we collected and examined the data using the theory of Implicative Statistical Analysis (ISA). We applied the technique of Implicative and Cohesive Hierarchical Classification (ICHC) extended by the M_{GK} method (ICHC-M_{GK}) to mine and analyze these data. This approach allowed us to address the numerical and graphical problems required by the ASI, as well as to classify valid M GK rules using a cohesion index, in order to generate meta-rules facilitating the interpretation of the results.

The results of our analysis reveal that when a teacher establishes links between the targeted knowledge, this tends to place students in a school posture, ready to assimilate the knowledge taught. Then, when the teacher gives meaning to the targeted knowledge, it often creates links between situations. In this study, we note that the teacher does not use many weaving postures with less than 20% of the occurrence, this generates little relationship between the teacher's weaving postures and the students' study postures.

The concept of proportionality is one of the didactic obstacles in science teaching due to the need for students to invest their knowledge in several laws in physics-chemistry, geography and life and earth sciences, if we only mention these subjects.

Weaving postures are essential to correct students' misconceptions, while promoting their motivation and understanding of the topics taught [9, 16]. It is therefore crucial to train teachers in depth, providing them with a better understanding of students' individual needs. This would allow them to adapt their teaching postures more effectively, according to the specificities of each learning context.

Abbreviations

ISA	Implicative Statistical Analysis
ICHC	Implicative and Cohesive Hierarchical Classification
IRLDET	Interdisciplinary Research Laboratory in Didactics, Education and Training (LIRDEF in French)
MGK	Measure Guillaume-Kenchaff
TIMSS	Trends in International Mathematics and Science Study

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Conflicts of Interest

The authors declare no conflicts of interest.

Appendix

Table 8. *Binary table.*

	$Tiss_1$	$Tiss_2$	$Tiss_3$	$Tiss_4$	Pel_1	Pel_2	Pel_3	Pel_4	Pel_5	Pel_6
Seq1	0	0	0	0	1	0	0	1	0	0
Seq2	0	1		0	1	1	0	0	0	0
Seq3	0	0	0	0	1	1	0	1	0	1
Seq4	0	1	0	0	1	1	0	0	0	1
Seq5	0	0	1	0	1	0	0	1	0	0
Seq6	0	0	0	0	1	0	0	1	0	1
Seq7	0	0	1	0	1	0	0	1	0	1
Seq8	0	0	0	0	1	0	0	0	0	1
Seq9	0	0	1	0	1	1	0	1	1	0
Seq10	0	0	0	0	1	1	1	0	0	0
Seq11	0	0	0	0	1	1	1	0	0	0
Seq12	0	0	0	0	1	1	1	0	0	0
Seq13	0	0	0	0	1	1	0	1	0	0
Seq14	1	0	0	0	1	0	0	1	0	0
Seq15	0	1	0	0	1	0	0	0	0	0
Seq16	0	0	0	0	1	1	0	0	0	0
Seq17	0	0	0	0	1	1	0	0	0	0
Seq18	0	0	0	0	1	1	0	0	0	0
Seq19	0	0	1	0	1	0	0	1	0	1
Seq20	0	0	0	0	1	1	0	0	0	0

	Tiss$_1$	**Tiss$_2$**	**Tiss$_3$**	**Tiss$_4$**	**Pel$_1$**	**Pel$_2$**	Pel$_3$	**Pel$_4$**	**Pel$_5$**	**Pel$_6$**
Seq21	0	0	0	0	1	1	0	0	0	1
Seq22	0	0	0	0	1	1	0	0	0	1
Seq23	0	0	1	0	1	1	1	0	0	0
Seq24	0	0	0	0	1	0	0	1	0	0
Seq25	0	0	0	0	1	1	0	0	0	0
Seq26	0	0	0	0	1	1	0	0	0	0
Seq27	0	0	0	0	1	0	0	1	0	0
Seq28	0	0	0	0	1	0	0	1	0	1
Seq29	0	0	0	0	1	1	0	0	0	0
Seq30	1	0	0	1	1	1	0	0	0	0
Seq31	1	0	0	1	1	0	1	1	0	1
Seq32	0	0	0	0	1	1	1	0	0	1
Seq33	0	0	1	0	1	1	0	0	0	0
Seq34	0	0	0	1	1	0	0	1	0	1
Seq35	0	0	0	0	0	1	1	0	0	0
Seq36	0	0	0	0	1	1	0	0	0	0
Seq37	0	0	1	0	1	1	0	0	0	0
Seq38	0	0	0	0	1	1	0	0	0	0
Seq39	0	0	0	0	1	0	1	1	0	1
Seq40	0	0	0	0	1	1	0	0	0	0
Seq41	0	0	0	0	1	1	1	0	1	0
Seq42	0	0	1	0	1	1	0	0	0	1
Seq43	0	0	0	1	1	1	0	0	0	0
Seq44	0	0	1	0	1	1	0	0	0	0
Seq45	0	0	1	1	1	0	0	1	0	1
Seq46	0	0	0	0	0	0	0	1	0	0
Seq47	0	0	0	0	1	1	0	0	0	0
Seq48	0	0	0	0	1	1	0	0	0	1
Seq49	0	0	1	0	1	1	0	1	0	1
Seq50	0	1	1	1	1	1	0	0	0	0
Seq51	0	0	1	1	1	1	0	0	0	0
Seq52	0	0	0	1	1	0	0	1	0	1
Seq53	0	1	0	1	1	0	0	1	0	1
Seq54	0	0	0	0	0	1	0	0	0	0
Seq55	0	0	0	1	1	0	0	0	0	0
Seq56	0	0	0	0	1	1	0	0	0	0
Seq57	0	0	0	0	1	1	0	0	0	0
Seq58	0	0	0	0	1	1	1	0	0	1
Seq59	0	0	1	0	1	1	0	0	0	0
Seq60	0	1	1	1	1	1	0	0	0	0
Seq61	0	0	0	1	1	1	0	0	0	0
Seq62	0	0	1	0	1	0	0	1	0	1
Seq63	0	0	1	0	1	1	0	0	0	0
Seq64	0	0	1	1	1	1	0	1	0	0
Seq65	0	0	0	1	1	1	0	0	0	0
Seq66	0	0	1	0	1	1	0	0	0	0
Seq67	0	0	0	0	1	0	0	1	0	1
Seq68	0	0	1	1	1	0	0	1	0	1
Seq69	0	0	0	0	1	1	0	0	0	0
Seq70	0	1	1	0	1	1	0	0	0	0
Seq71	0	0	0	0	1	1	0	0	0	0
Seq72	0	0	0	0	1	1	0	0	0	0
Seq73	0	0	0	1	1	1	0	0	0	0
Seq74	0	0	0	0	1	1	0	0	0	0

	Tiss$_1$	**Tiss**$_2$	**Tiss**$_3$	**Tiss**$_4$	**Pel**$_1$	**Pel**$_2$	Pel$_3$	**Pel**$_4$	**Pel**$_5$	**Pel**$_6$
Seq75	0	1	0	0	1	1	0	0	0	0
Seq76	0	0	0	0	1	0	0	0	0	0
Seq77	1	0	1	0	1	1	0	0	0	0
Seq78	0	1	0	0	1	1	0	0	0	0
Seq79	0	0	1	0	1	1	0	1	0	1
Seq80	0	0	0	0	1	0	0	1	0	0
Seq81	0	1	0	0	0	1	0	0	0	0
Seq82	0	0	0	0	1	1	0	0	0	0
Seq83	0	1	0	0	1	1	0	0	0	0
Seq84	0	1	1	0	1	1	0	0	0	0
Seq85	0	0	0	1	1	0	0	0	0	0
Seq86	0	0	0	1	0	1	0	0	0	0
Seq87	0	0	0	1	0	0	0	1	0	0
Seq88	0	0	0	0	0	1	0	0	0	0
Seq89	1	0	0	0	1	0	0	1	0	0
Seq90	1	0	0	0	1	1	0	0	0	0
Seq91	0	0	0	0	1	0	0	1	0	0
Seq92	1	0	0	1	0	1	0	0	0	0
Seq93	0	0	0	0	0	1	0	0	0	0
Seq94	0	0	0	0	0	0	0	1	0	0
Seq95	0	0	0	0	1	0	0	0	0	0
Seq96	0	0	0	0	0	1	0	0	0	0
Seq97	0	0	0	0	0	1	0	0	0	0
Seq98	0	0	0	0	0	1	0	0	0	0
Seq99	0	1	0	0	0	1	0	0	0	0
Seq100	0	0	0	0	1	0	0	0	0	0
Seq101	0	0	0	0	1	0	0	0	0	0
Seq102	0	0	0	0	0	0	0	0	1	0
Seq103	0	0	0	0	0	1	0	0	0	0
Seq104	1	1	0	0	1	0	0	0	0	0
Seq105	0	0	0	0	1	1	0	0	0	0
Seq106	0	0	0	0	1	0	0	0	0	0
Seq107	0	0	0	0	0	1	0	0	0	0
Seq108	0	1	0	0	0	1	0	0	0	0
Seq109	0	0	0	0	0	1	0	1	0	0
Seq110	0	0	0	0	0	1	0	1	0	0
Seq111	0	0	0	0	0	1	0	0	0	1
Seq112	0	0	0	0	1	0	0	0	0	0
Seq113	0	0	0	0	1	0	0	0	0	0
Seq114	0	0	0	0	1	0	0	0	0	0
Seq115	0	0	1	1	1	0	0	0	0	0
Seq116	0	0	0	0	1	0	0	0	0	0
Seq117	0	0	0	0	1	0	0	1	0	0
Seq118	0	0	0	0	1	0	0	1	0	0
Seq119	0	1	0	0	1	0	0	1	0	0
Seq120	0	0	0	0	1	1	0	0	0	0
Seq121	0	0	0	0	1	1	0	0	0	0
Seq122	0	0	0	0	0	1	0	0	0	0
Seq123	0	0	0	0	1	1	0	0	0	0
Seq124	0	0	0	0	1	0	0	0	0	0
Seq125	0	0	0	0	1	0	0	0	0	0
Seq126	0	0	0	0	0	1	0	0	0	0
Seq127	0	0	0	0	1	1	0	0	0	0
Seq128	0	0	0	0	0	1	0	1	0	0

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