The Design of Tasks to Suit Distance Learning in Emergency Education

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Abstract: Researchers are interested in task design in distance learning. This task design is critical in emergency education that uses distance learning. The present research investigated mathematics and science teachers’ task design in distance learning during the emergency education due to COVID-19. Fourteen teachers participated in the research: seven mathematics teachers and seven science teachers. The data collection tool was the interview, and the data analysis tools were deductive and inductive content analysis, where the deductive analysis was based on the didactic situation framework. The research results indicated that the participating teachers could utilize the technological tools to design tasks that encourage the students’ devolution regarding the activities that they carry out. Furthermore, the use of the potentialities of the distance learning platforms enabled successful communication between the participants in the didactic situation. It is recommended that quantitative research is used to investigate the ways in which the various components in the design could affect students’ learning.

Keywords: task design; teachers; mathematics; science; didactic situation; emergency education; COVID-19

1. Introduction

The recent emergency education that took place as a result of COVID-19 necessitated designing activities in order to fit the online learning to which the schools and universities turned due to the closure. This design involved the use of digital tools that helped advance students’ learning, especially their engagement [1], their motivation [2] and their emotions [3]. It is interesting to study how teachers designed activities during the emergency education, and especially the aspects of learning on which they focused. In the present research, we study teachers’ design of activities for online learning in the science and mathematics classroom during the emergency education forced by COVID-19.

2. Theoretical Background and Literature Review

2.1. Distance Learning in Emergency Education

Distance education has been utilized in the classroom for three decades, and it facilitates educational processes for teachers and students alike. It enables interactions between the participants in the educational processes [4], motivation for learning [5], engagement in learning [6], and the assessment of learning [7]. Lately, distance learning has flourished in the emergency education that occurred due to COVID-19 [8]. This flourishing made researchers consider this mode of learning extensively (ex., [9]). In the present research, we consider task design in distance education during the emergency education that occurred due to COVID-19.

Hodges et al. [10] distinguished between online learning, which is planned from the beginning and designed to be online, and emergency remote teaching, which is a temporary
shift of instructional delivery to an alternate delivery mode due to emergency circumstances. Hodges et al. [10] described emergency remote teaching as involving the use of fully remote teaching solutions for instruction that otherwise would be delivered face-to-face, or as blended or hybrid learning. A similar argument is made by Tzafiikou et al. [11], who distinguish between ‘remote’ and ‘distance’ learning, focusing on the remote side due to the COVID-19 emergency situation. They argue that, contrary to distance learning, ‘Remote Education’ is defined by the geographical separation of learners and teachers. In addition, ‘Emergency Remote Education’ is temporal and obligatory, while distance education is an option. In the present research, we address task design in emergency remote education. As emergency remote education is only lately being studied, we address task design in online learning below.

2.2. Task Design in Online Learning

Researchers have been interested in course and task design in distance learning (ex., [12]). Herrington et al. [13] argued that the design of an authentic online task should allow the students to make important decisions about why, how, and in what order they investigate a problem. Wang [14] proposed a set of criteria for designing videoconferencing-based tasks: practicality, language-learning potential, learner fit, authenticity, and positive impact. This set was first suggested by Chapelle [15] for CALL Task Appropriateness, where Wang ([14] fitted it to videoconferencing task design. For example, she defined practicality as “the fit between the task and the capability of the videoconferencing tool(s) to support task” ([14], p. 593).

Coman et al. [16] advised that tasks should involve teamwork to compensate for the lack of interaction in the online environment. They argue that this should be achieved with creativity in thinking when designing tasks, not only to stimulate collaborative learning but also to involve technical skills that help create and implement programs to improve interaction between students. Valverde-Berrocoso et al. [17], in a systemic review, found that diverse studies had identified nine elements for sustainable e-learning design—(a) stakeholder-centeredness: (1) a labor market-driven programming agenda, (2) a continuous improvement quality assurance system, and (3) international program standards; (b) cost-effectiveness: (4) a costing model, (5) course rationalization, and (6) a learning object repository; and lastly, (c) high operational efficiency: (7) template-based document preparation, (8) project management, and (9) an electronic project workspace.

2.3. Design of Mathematics and Science Activities

Researchers have been interested in the activity design process and in the outcome of this process. Leung and Bolite-Frant argued that “a participationist orientation would favor design with potential for students to participate in the construction of mathematical knowledge/experiences, whereby a more acquisitionist orientation would favor design that encourages the student to explore and discover established mathematical knowledge” ([18], p. 192). Thus, the educational orientation influences the activity design. Furthermore, Leung and Bolite-Frant ([18], p. 193) suggested that “[A] tool-based task design could harvest this power to shorten any distance between students’ prior mathematical experiences and the intended mathematical knowledge to be learned”.

Jahreie et al. [19] reported discussions on the design of science learning in the context of museums by researchers and designers. They found that the central concern for the participants in the discussion was how they could design the exhibition in a way that stimulated students’ curiosity, interest, and motivation to take up the meaning-making of the scientific concepts involved.

In the present research, we will study the design of science and mathematics activities by teachers in the emergency education forced by the COVID-19 pandemic. In order to do so, we will use the didactical situations theory of Brousseau [20]. We will achieve this by focusing on the activity as a main component of the didactic situation.
2.4. Didactical Situations Theory

A didactical situation comprises three components: students, teachers, and the milieu [20]. The students interact with other students, with the teacher and with the milieu. The milieu is defined as all of the things that influence the student or are influenced by the student: “Within a situation of action, everything that acts on the student or that she acts on is called milieu” ([20], p. 9). Mackrell et al. stressed the role of activities in the didactic situation: Key aspects of a didactical situation are the mathematical problem and the choice of didactical variable values to set for the task, where the task involves learning objectives and the mathematical problem. The teacher assumes that achieving the task will cause the student to learn ([21], p. 2655).

Two components of the didactical situation framework are devolution and institutionalization. “Devolution is the act by the teacher makes the student accept the responsibility for an (adidactical) learning situation or for a problem, and accepts the consequences of this transfer of this responsibility” ([20], p. 230), while institutionalization occurs as “[the teacher] defines the relationships that can be allowed between the student’s ‘free’ behavior or production and the cultural or scientific knowledge and the didactical project; she provides a way of reading these activities and gives them a status”. ([20], p. 56). Thus, it could be said that institutionalization occurs when arriving at the socially constructed mathematical knowledge [22].

Jonsson et al. [23] intended to allow for mathematical “struggle” in adidactical situations (without teacher support) with tasks that are designed to facilitate students’ own construction of solutions. In order to do so, they suggested that we consider Lithner’s [24] framework of creative and imitative reasoning. In doing so, they called the second type of reasoning “algorithmic reasoning” (AR). Artigue ([25], p. 160) says that we should pay attention to “the characteristics of the milieu with which the students will interact in order to maximize the potential it offers for autonomous action and productive feedback”. Thus, students’ autonomy is a factor that we need to consider when we come to design activities by following the didactical situation framework.

Brousseau et al. [26] say that in the didactical contract, which is part of the didactical situation, we need to consider how the teacher takes responsibility for supporting the collective and individual activity of the students ([26], p. 155). They also talk about confirming claims in the situation or giving proofs ([26], p. 155). In addition, Brousseau and Warfield ([27], p. 163) talk about the following components of the didactical situation—making decisions, formulating hypotheses, predicting and judging their consequences, attempting to communicate information, producing and organizing models, arguments and proofs, etc.—which are adequate for certain precise projects. The present research will consider the previous constructs when mathematics and science teachers design activities for online learning in the context of emergency education.

3. Research Rationale, Goals, and the Question

3.1. Research Rationale and Goals

The design of learning materials has attracted the attention of researchers because it influences the outcomes of students’ learning. Lin and Chen ([28], p. 3554) say that “Designing teaching activity for digital learning and flexibly applying technology tools are the key issues for current information technology integrated education”. The previous claim is especially true in online learning in the context of emergency education. Previous studies have mainly addressed the issue of task design in online learning in the context of emergency education only, or indirectly (ex., [12]). The present research addresses this issue using a theoretical framework that has been used to consider task design in mathematics education (ex., [21]), where here we use it for online learning in the context of emergency education. The use of the didactical situation framework will allow us to utilize its various components to evaluate the design of online activities in the context of emergency education. These components are devolution, institutionalization, algorithmic reasoning,
creative reasoning, autonomy, the individual activity of the student, the collective activity of the student, making decisions, and attempting to communicate information.

3.2. Research Question

What are the characteristics of the processes of the didactical situation which are considered by mathematics and science teachers in their task design during the emergency distance education?

4. Methodology

4.1. Research Design

The present research uses the qualitative methodology to study the design of online tasks by mathematics and science teachers. This use of qualitative research is in line with researchers who consider qualitative methodologies to have the potential to shape and advance important questions of educational practice and policy [29]. In order to conduct the qualitative research, we collected the data using semi-structured interviews. This use of semi-structured interviews is in line with researchers who argue that those interviews can serve the investigation of teachers’ education and teachers’ practices [30,31].

In the qualitative research, we used deductive and inductive content analysis. Our use of deductive reasoning depended on the didactical situation theory. Mangiante-Orsola et al. [32] argued that didactical situations can be used to answer research questions concerning teaching practices, the production of resources for teaching, and teacher development. Thus, the didactical situation theory is relevant to the present research, as it attempts to answer questions concerning teaching practices and the production of resources for teaching, when it focuses on emergency education. Deductive content analysis provided us with the categories in Table 1. We used inductive content analysis to arrive at the specific themes within each category of the didactic situation.

Table 1. Describes the participants in terms of specialty, age and specialty.

| Participant | Specialty | Age | Experience |
|-------------|-----------|-----|------------|
| Amal        | Mathematics | 36  | 14         |
| Salim       | Mathematics | 33  | 12         |
| Mansour     | Mathematics | 16  | 8          |
| Amir        | Mathematics | 37  | 15         |
| Alham       | Mathematics | 33  | 13         |
| Koltoum     | Mathematics | 36  | 12         |
| Karima      | Science    | 43  | 20         |
| Amira       | Science    | 35  | 12         |
| Sulam       | Science    | 36  | 14         |
| Sana        | Science    | 38  | 15         |
| Sama        | Science    | 37  | 13         |
| Hasan       | Science    | 42  | 16         |
| Amina       | Science    | 34  | 12         |

4.2. Research Context and Participants

The present research is interested in the design of online tasks by ninth grade mathematics and science teachers. Fourteen teachers participated in the research: seven of them were mathematics teachers and seven were science teachers. The research participants were chosen based on convenience sampling. Etikan et al. [33] said that convenience sampling is a type of non-random sampling where the participants meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate. Etikan et al. [33] stressed that convenience sampling also refers to the subjects of the population that are easily accessible to the researcher. In the
present research, we used convenience sampling because of the accessibility issue, as well as meeting specific criteria related to the present research, which involved mathematics or science teachers who had experience in distance learning during COVID-19.

We administered informed consent forms to the participating teachers in order for them to participate in the research. The consent form was written in a language easily understood by the participants, which minimized the possibility of misunderstanding. The participants were given sufficient time to consider participation in the research. The participants signed the informed consent forms to participate in the research, agreeing that the collected data could be used for research goals only.

The participants used distance learning, as a result of emergency education due to COVID-19, from April 2020 to June 2021.

4.3. Data Collection Tools

We collected the data by interviewing the participants regarding their design of mathematics and science activities for online learning during emergency education. The interview was semi-structured, starting from open questions such as “What activities did you use for online learning during the emergency education?” We continued with more leading questions. We tried to address all of the characteristics of the design according to the didactical situation theory. Examples of the leading questions from the interview are: “Can you describe activities that you designed and that take care of confirming or giving autonomy?”, and “Can you describe activities that you designed and that take care of confirming or making a decision?”

The interviews were held using the Zoom platform or the WhatsApp application. Each interview lasted between 40 and 50 min. The communication channel was determined by consulting the interviewee.

4.4. Data Analysis Tools

We used the deductive content analysis method to arrive at the categories associated with the participating teachers’ design of tasks for online learning during the emergency education. This deductive constant comparison was based on the categories associated with learning processes that are part of the didactical situation theory. This deductive content analysis gave us the categories in the left column of Table 2. In addition, we used inductive content analysis to arrive at the themes within each category. For example, concerning the category “Making decisions”, we arrived at the themes: “The problematic issue of designing a task of which the goal is decision making”, “making a decision on the strategy in a proof task” and “making a decision on the strategy in a problem-solving task”.

4.5. Validity and Reliability of the Analysis Method

In order to evaluate the analysis method, we used the criteria described in Lincoln and Guba [34]. The first criterion is trustworthiness. Trustworthiness has the aim of supporting the argument that the inquiry’s findings are “worth paying attention to” [25]. Trustworthiness could be assessed through credibility, dependability, conformability, transferability or authenticity. Below, we address each component as it relates to the present research. We do this depending on Elo et al. [35].

4.5.1. Credibility and Dependability

In order to establish credibility, the participants in the research should be identified and described accurately. This is also related to dependability, which refers to the stability of data over time and under different conditions. Elo et al. [35] said that this could be achieved when the principles and criteria used to select the participants are clear, and when we detail the participants’ main characteristics so that the transferability of the results to other contexts can be assessed [36]. Here, we decided to interview ninth grade mathematics and science teachers. Above, we described the participants in terms of age and seniority as
mathematics and science teachers. In addition, we interviewed fourteen teachers to try to cover the homogeneity of the study participants and the differences between them [37].

### Table 2. Categories and codes used in the deductive reasoning.

| Categories of Processes in a Didactical Situation | Definition | Examples on Codes |
|-------------------------------------------------|------------|-------------------|
| Devolution                                     | Accepting the responsibility of learning, solving, etc. | Investigate, explore, find out |
| Institutionalization                           | Arriving at the formal conception, general solution, etc. | Formalize, conclude, generalize |
| Algorithmic reasoning                          | Following a sequence of directions to solve a problem. | Solve according to the … method, solve according to a sequence of steps |
| Creative reasoning                             | Flexibility: Giving many solutions, ideas, etc. | Give various solutions, give frequent solutions, give many solutions |
|                                                | Originality: Giving new solutions, ideas, etc. | You can use new solution method, you need to write a new solution. |
| Autonomy                                       | The ability to choose a solving strategy, a learning method, etc. | Choose a solving strategy, choose your role in the group |
| Individual activity of the student             | Activity in which the author requests the reader to work individually | Individually, each one. |
| Collective activity of the student             | Activity in which the author requests the reader to work in a group | In groups, collectively |
| Making decisions                               | Deciding upon a learning strategy, a solving method, etc. | Make a decision, decide what strategy. |
| Attempting to communicate information          | Arguing or discussing a scientific issue | Argue, discuss. |

#### 4.5.2. Conformability

The conformability of the data means the extent to which the findings accurately represent the information that the participants provided, and to which the interpretations of those data are not invented by the inquirer [38]. In the present research, we addressed conformability by computing the agreement between the coders. Three experienced coders coded the resulting themes and categories, searching for occurrences of sentences that indicated a design theme within each category of the didactical situation. The agreement between the coders (Cohen’s Kappa coefficient), when satisfied, ensures the reliability of the qualitative coding. The computation of Cohen’s Kappa coefficient resulted in 0.91 to 0.96 for the various categories related to the task design. These values are accepted for the agreement between coders.

#### 4.5.3. Transferability

Transferability refers to the reasoning that findings can be generalized or transferred to other groups of participants or settings. The transferability increases when we give clear descriptions of the context, selection, and characteristics of participants. We tried to take care of transferability by detailing the research setting above, as well as the description of the participants. Transferability is also guaranteed when we show how we analyzed the collected data. This is described in Table 2, which includes the definition of the categories of the task design considered in the present research.

#### 4.5.4. Authenticity

Authenticity refers to the extent to which the researchers, fairly and faithfully, show a range of realities [35]. The authenticity could suffer from the inaccurate analysis of inexperienced researchers who do not have the knowledge and skills required. Our computation of the agreement between the judges ensured authenticity. In addition, we followed, in our analysis, different qualitative studies (ex., [39,40]), which also enriched the authenticity of the data analysis.
4.5.5. Saturation of the Data Collection and Analysis

Saturation is another criterion that ensures validity and reliability. In the present research, it was arrived at during the analysis of the tenth interview, where the themes and their properties were the same as those in the previous nine interviews. Despite the recurrence of the categories, we analyzed another two interviews, which again showed the recurrence of the properties of the categories.

5. Results

5.1. Devolution Processes

The participating teachers talked about three categories of devolution processes: taking responsibility, making decisions, and autonomous processes. Below, we elaborate on each one of them.

5.1.1. Taking Responsibility

The participating teachers talked about two types of taking responsibility: taking responsibility for presenting the learning material in Zoom’s main session, and taking responsibility for the group’s work in Zoom Rooms.

Taking Responsibility for Presenting the Learning Material in Zoom’s Main Session

Amal, a mathematics teacher, described her students’ taking responsibility for presenting the topic in the main Zoom session. She said:

“In part of the lessons in Zoom, I requested one student to present the topic of the lesson after he learned it from the book. I did that to encourage the students to be present in the lesson. The lesson turned to be very successful”.

Taking Responsibility for the Group’s Work in Zoom Rooms

Karima, a science teacher, described her students’ taking responsibility for their work in Zoom Rooms:

“During Zoom’s sessions, I let the students carry out the investigative activities that I build in Zoom Rooms. I give them complete responsibility how to carry out the activity. For example, which group’s member works on the PhET simulations, who writes the results and who present them”.

5.1.2. Making Decisions

The participating teachers talked about two types of making decisions: making a decision on the strategy in a proof task, and making a decision on the strategy in a problem-solving task.

The Problematic Issue of Designing a Task of Which the Goal Is Decision Making

Before presenting the types, it is interesting to note that three of the participating teachers reported that they did not design a task with the goal of their students making decisions. Salim, a mathematics teacher, said: “I do not remember that I gave the students a task in which I requested them to take decisions. It could be that the students take decision in Geometry, but I did not design such task”.

Making Decisions on the Strategy in a Proof Task

Mansour, a mathematics teacher, described what he understood by task design which includes making decisions:

“Usually, the student takes decision when he comes to a problem designed as proving a claim. For example, when coming to prove that two edges are equal, the student has to decide which theorem of congruent triangles to use. This decision also depends on the pair of triangles on which he decides to do the congruence. The students solved these problems during Zoom’s main session, or in Zoom Rooms”.

Making Decisions on the Strategy in a Problem-Solving Task

Koltoum, a mathematics teacher, described her task design, saying: “I designed activities, during the main session of Zoom, in which I demonstrated for the students how to take decisions on the strategies they use to solve a mathematical problem. For example, whether to use the rule or the factorization to solve a quadratic equation”.

5.1.3. Autonomous Processes

The participating teachers talked about four types of autonomous processes: autonomous processes through discussion, autonomous processes through discovery, autonomous processes through games, and autonomous processes through practice.

Autonomous Work through Discussion

Amir, a mathematics teacher, considered the whole-class discussion as task-design that encourages the autonomous work of the students: “In the design of activities, we used the interactive board for letting the students develop their knowledge. The students worked alone, and then we discussed their work. All the students participated in the discussion and understood the mathematical topic. I almost did not interfere in the discussion. It was the students’ own engagement”.

Autonomous Work through Discovery

Amal, a mathematics teacher, considered the design of discovery learning as encourages the autonomous work of the students. Amal said: “The students work autonomously when you let them learn by discovery. One activity that I designed for the students during the online learning was the triangle heights activity. The activity consisted of a set of questions that advanced in complexity. I put this activity in the classroom site. It requested the students to draw, with GeoGebra, an acute-angles triangle and then draw its heights. This question was followed by one that requested the student to write a conclusion about the heights in an acute-angles triangle. Afterwards we moved to the right-angle triangle, doing the same steps, and then to the obtuse-angle triangle”.

Autonomous Work through Games

Salam, a science teacher, described how the Genially application helped her to design an activity that enabled her students to learn autonomously through games. She said: “I designed game activities, such as the ‘Treasure Hunt’ activity and the ‘Escape Room’ activity. I built these activities in the ‘Genially’ application. This application can transform data and information into images and graphics that can be clearly understood. It contains several free, attractive and modern templates to prepare presentations and live games such as (Ladder and Snake, Treasure Island...). We can use these templates to design games”.

Autonomous Work through Practice

Salam also used technological applications to design an activity that allowed her students to practice autonomously the learned materials. She said: “After I taught the students the subject of ions in chemistry, they had to practice a lot on it. Because the subject of ions needed to be practiced a lot by the students, I built an activity in Genially application. I did not want to give the students regular worksheets all the time, because the students will get bored, so I used Genially. This way, the student solves, and if his answer is wrong or true, this will appear through the application, and therefore the student either takes a step forward or corrects his mistake. This will enable the students to advance a step within the application. Thus, the student works independently, which makes him develop independence”.
5.2. Institutionalization Processes

The participating teachers talked about three types of institutionalization processes in their task design: processes in the conclusions at the end of the discovery learning, processes on the sites that feature the learning materials, and processes in the formal textbooks.

In the Conclusions at the End of the Discovery Learning

Ahlam, a mathematics teacher, said: “We usually arrived at the generalization of the topic in the whole-class discussion in the Zoom session after the students worked in groups in Zooms’ rooms, where they explored the mathematics topic”.

On the Sites That Feature the Learning Materials:

Amira, a science teacher, said: “When I gave the students an asynchronous task, I requested them after solving the investigative task to verify their conclusions by looking for scientific material on suitable sites”.

In the Formal Textbooks

Amina, a science teacher, said: “In asynchronous distance learning, the textbook served us to arrive at the formal conclusions of the science topic. I asked them to read the formal conclusions from the textbook, so that they use the exact scientific formulation”.

5.3. Algorithmic Processes

The participating teachers talked about two types of algorithmic processes in their task design: processes which are algorithmic in structure, and those which are algorithmic in actions.

Activity of the Type ‘Algorithmic in Structure’

The activities of the type ‘algorithmic in structure’ included project-based activities, where these activities conditioned the work in the project. Amal, a mathematics teacher, described one of these activities:

“We were searching for different tasks and activities, for example one of the activities with which I engaged the students was projects. In designing the activity, I took care that the text included what was needed from each group. It also included the links that they could use to carry out the project, as well as the final product of the project”.

The project, as an activity, includes some freedom for the students regarding the roles of the members in the group. This is especially true in distance learning, where this learning happens using distance communication tools. Thus, in this case, the algorithmic process refers to the structure of the activity, as perceived by the participating teachers.

Activity of the Type ‘Algorithmic in Actions’

The activities of the type ‘algorithmic in actions’ included the sequence of actions that the students were requested to perform. One such activity was described by Sama, a science teacher:

“Among the topics that I taught, we had the topic of “reagents”, a topic related to acids and bases. The activity that I developed required to do a home experiment in which the student investigates whether certain substances are acidic or basic. Of course, before that, I explained to the students about the subject, I sent them materials to read as a scientific background on the subject, and then I sent the students a paper explaining the series of the steps of the experiment. I prepared the materials and presented them to the students from the school laboratory, and the students did the experiment at home according to the steps given to them”.

5.4. Creative Processes

The participating teachers talked about four types of creative processes: the creativity of the student in the regular activities, the creativity of the student in the enrichment
activities, the creativity of the student in the fun activities, and the creativity of the teacher in the online setting.

The Creativity of the Student in the Regular Activities
Amir, a mathematics teacher, described a problem that he gives as a regular activity in the main Zoom session:
“I gave the students a problem that required them to think creatively. This problem requested the students to write a quadratic function that intersects the x-axis in two specific points. I wanted the students to be aware that different functions could satisfy the conditions”.

The Creativity of the Student in the Enrichment Activities
Salim, a mathematics teacher, described an enrichment activity in which his students engaged in creative mathematics learning:
“During learning the topic of the function slope, it was important to give the students an enrichment activity. The students solved an activity using GeoGebra, where they were requested to draw a flower in different ways. The students were requested to draw this flower in GeoGebra using straight lines and find the slopes of the lines and the relationship between them. In this activity, the students drew any flower that they wanted. Thus, they had the freedom to draw the flower, which made each one attempt to draw more than one flower, and some succeeded to do so. The students described their drawings as creative”.

The Creativity of the Student in the Fun Activities
Sana, a science teacher, described a fun activity in which her students were engaged creatively:
“I built an activity for the students using the table of elements. The elements’ symbols in chemistry are in Latin, so the students find them difficult. The activity requested the students to form meaningful sentences from these symbols. They created sentences such as “Eid Fitr Mubarak”, or “Stay at home’, where the last sentence fits the period of COVID-19”.

The Creativity of the Teacher in the Online Setting
Amira, a science teacher, described an activity that she considered to imply her creative thinking:
“I want to tell you about an activity that I designed for the start of the lesson. This activity intended to attract the students to distance learning. I designed an activity called “Chemical Wisdom”, which is related to the topic. For example, when I taught the students about the table of elements, I took into consideration that the elements in the same column feature common characteristics. So, I formulated the wisdom: Be strong as iron, be radioactive as uranium, be positive as the proton, do not be negative about any element. We started the lesson by saying the wisdom. The students were very pleased and every day they waited for me, entering the Zoom platform before the start of the class, so that they would not miss the chemical wisdom of the day. The design of the activity took advantage of different applications that helped display the wisdom in a beautiful way, such as ‘Emaze’”.

5.5. Individual Work
The participating teachers talked about three types of individual work: individual work in exploration activities, individual work in homework, and individual work in summary tasks.

Individual Work in Exploration Activities
Ahlam, a mathematics teacher, described an exploration activity with GeoGebra: “I designed activities that requested the students to work individually on exploration
activities, as using GeoGebra to find the relation between the graph of a parabola and the parameters of the quadratic equation”.

Individual Work in Homework
Ahlam, a mathematics teacher, reported the use of individual work in homework: “The homework was in general individual. It consisted of questions of different level on the material that the student learned in the class”.

Individual Work in Summary Tasks
Hasan, a science teacher, described his use of individual work in summary tasks: “At the end of the unit, I gave the students an activity that requested them to write a summary of the unit using the presentation that they chose: PowerPoint, Word, electronic book, Nearpod, etc”.

5.6. Collaborative Work
The participating teachers talked about two types of individual work: collaborative work to solve difficult problems, and collaborative work to address scientific ideas outdoors.

Collaborative Work to Solve Difficult Problems
Amir, a mathematics teacher, said: “when the problem that I gave the students was not an easy one, I designed that the students solve this problem collaboratively in Zoom Rooms. This helped them discuss it and I could watch this and interfere when needed”.

Collaborative Work to Address Scientific Ideas Outdoors
Sana, a science teacher, described her attempts to provide her students with collaborative work during the emergency education: “I did not like that my students, during the distance learning period in light of the emergency situation of Corona, were deprived of any activity they were accustomed to in face-to-face learning, such as collaborative learning. After the students had learned most of the topics required of them, I thought I would give them an opportunity to investigation. So, I decided that we should conduct a collaborative investigation activity, which we called it “Science through the Eye of a Camera”. What does it mean? I started thinking what the things were that all students loved and indulged in most of the time? I found that they were mobile phones, cameras, photography and publishing”.

When Sana was asked by the reviewer to elaborate, she said: “I took advantage of this idea and announced the “Science through the Eye of a Camera” competition. The competition was presented and published on WhatsApp for groups of students’ parents to get an idea about a topic, and we encouraged the students that the winning group in this project would have a bonus. There was a jury to judge who was the group who performed the best work and the best investigation. We divided the students into groups to work collaboratively and delegated them to go to photograph a phenomenon in nature and then tell us about it. They were also requested to explain why this phenomenon appeared in the winter like the “rainbow” phenomenon, based on research on the phenomenon and by fetching information about it. We sent rules and specific instructions for students to work according to and announced the day of the competition. We used an application called “Art steps” to design this activity. This tool allows to create three-dimensional exhibitions for specific projects such as displaying pictures, paintings and models”.

5.7. Communication
The participating teachers talked about four types of communication: communication using mobile social networks, communication using Zoom rooms, eye communication in Zoom sessions, and teachers’ communication in the Google Classroom.
Communicating Using Mobile Social Networks

Amina, a science teacher, reported that in order to encourage her students’ communication during the emergency education, she built a WhatsApp group. She said: “I built a WhatsApp group for each class. The students used this group to communicate about everything related to mathematics. Sometimes I used the WhatsApp to put a question that is difficult. I took into consideration that the students would inquire about this question, about the content of the question, or about strategies to solve the question”.

Communication Using Zoom Rooms

Samira, a mathematics teacher, reported that she used Zoom Rooms to facilitate her students’ discussion of new topics. She said: “I used Zoom Rooms for the students to investigate together a new topic that needed discussion to understand. For example, when introducing the quadratic function”.

Eyes Communication in Zoom’s Sessions

Saeed, a mathematics teacher, pointed out that communication is interaction, and that eye interaction is very important to the learning of the students. He said: “The student should not be just listening, why? Because if you make the students just listen, they will be lost. The camera must be on, the student must be active in the lesson. During the explanation, the student is asked to explain specific points. In the activities that I design, the students are the ones who lead the lesson. You as a teacher give the initial content and then conduct the discussion among the students. In order to encourage the interaction between the students, we used different applications: the interactive whiteboard, live worksheets and FullProof”.

Teachers’ Communication in the Google Classroom

Amira, a science teacher, described her communication with other teachers in the Google Classroom: “There is a group dedicated to science teachers, I put each task that I designed in the classroom, and every other teacher also puts his designed tasks there. So, we have a store of tasks and activities”.

Table 3 describes the frequency of the mathematics and science teachers mentioning each theme and category.

Table 1 shows that the mathematics and science teachers, when designing tasks in remote emergency education, were concerned with autonomous, individual and communicational processes more than other processes. In addition, the mathematics and science teachers did not differ regarding the didactical situation processes that they utilized in their online task design.

Table 3. Frequency of the mathematics and science teachers mentioning each theme and category.

| Category           | Theme                                           | MT | ST | All |
|--------------------|-------------------------------------------------|----|----|-----|
| Taking responsibility | Taking responsibility on presenting the learning material in Zoom’s main session | 1  | 1  | 2   |
|                     | Taking responsibility on the group’s work in Zoom’s rooms | 5  | 4  | 9   |
|                     | The problematic issue of designing a task whose goal is decision making | 3  | 3  | 6   |
| Taking decisions    | Taking decision on the strategy in a proof task | 3  | 2  | 5   |
|                     | Taking decision on the strategy in a problem-solving task | 1  | 1  | 2   |
Table 3. Cont.

| Category          | Theme                                           | MT | ST | All |
|-------------------|-------------------------------------------------|----|----|-----|
| Autonomous processes | Autonomous work through discussion               | 5  | 6  | 11  |
|                   | Autonomous work through discovery                | 5  | 6  | 11  |
|                   | Autonomous work through games                    | 2  | 3  | 5   |
|                   | Autonomous work through practice                 | 3  | 3  | 6   |
| Institutionalization processes | In the conclusions at the end of the discovery learning | 6  | 5  | 11  |
|                   | On the sites that have the learning materials     | 1  | 1  | 2   |
|                   | In the formal textbooks                          | 1  | 2  | 3   |
| Algorithmic processes | Activity of the type 'algorithmic in structure' | 3  | 4  | 7   |
| Creative processes | Creativity of the student in the regular activities | 3  | 4  | 7   |
|                   | Creativity of the student in the enrichment activities | 2  | 2  | 4   |
|                   | Creativity of the student in the fun activities   | 2  | 3  | 5   |
|                   | Creativity of the teacher in the online setting  | 4  | 4  | 8   |
| Individual work   | Individual work in exploration activities        | 6  | 5  | 11  |
|                   | Individual work in homework                      | 7  | 7  | 14  |
|                   | Individual work in summary tasks                 | 4  | 3  | 7   |
| Collaborative work: | Collaborative work to solve difficult problems   | 5  | 3  | 10  |
|                   | Collaborative work to address scientific ideas outdoors | 5  | 4  | 9   |
|                   | Communicating with mobile social networks        | 3  | 3  | 6   |
| Communication     | Communication with Zoom’s rooms                  | 6  | 7  | 13  |
|                   | Eyes communication in Zoom’s sessions            | 6  | 6  | 12  |
|                   | Teachers’ communication in the Google Classroom   | 2  | 2  | 4   |

MT = mathematics teachers; ST = science teachers.

6. Discussion

The present research came to investigate the design processes of mathematics and science tasks during online emergency education. In order to do so, we used the didactical situation framework and looked at some of its components. Below, we discuss our findings in relation to the different components of the didactic situation.

6.1. Devolution Processes

The research results indicated that the devolution processes were of three types: taking responsibility, making decisions, and autonomous processes. These processes indicate that part of the learning that occurred in the mathematics and science classrooms, in the time of the emergency education, was performed in a social environment that encouraged democratic practices such as autonomy and making decisions ([41,42]). In addition, this environment encouraged digital citizenship as taking responsibility [43]. It is argued that teachers, when confronted with emergency education, could also manage task design in distance learning. This utilization depended on different factors, and one of the main factors was the use of resources. Autonomy, for example, was enabled due to the utilization of digital resources. The participating teachers reported the use of the whiteboard, GeoGebra, and Genially to enable their students to be autonomous. They also reported the use of PhET simulations in tasks in which the students took responsibility for their execution. Zoom Rooms enabled these social processes, especially the students’ interaction [44].

6.2. Institutionalization Processes

Institutionalization processes had the goal of arriving at scientific relations, as accepted by the professional community. Here, the teachers, in their design of tasks that encouraged institutionalization processes, used digital tools such as internet sites, as well as non-digital
resources such as the regular textbook. Thus, the use of tools here in the design of tasks was blended. The teachers were part of emergency education, so they used digital and non-digital resources. It could be that their past use of non-digital resources made them utilize them in the new mode of their students’ learning. Here, this is not strange, as the textbooks included formal content.

6.3. Algorithmic and Creative Processes

The participating teachers reported that they designed tasks that used algorithmic and creative processes. These two processes could be considered two end points of an interval that represents learning processes [23]. We claim that the explorative processes that were part of the learning experience in the mathematics and science classes during the emergency education were part of that interval, lying between the algorithmic and the creative processes. Thus, the learning processes in the distance education during the COVID-19 pandemic were of a different type, which could indicate the potential of distance education—even in times of emergency—to enable different types of learning processes. This points at distance education as having the potential to be part of students’ learning in regular times. Other studies reported that, with support from parents and teachers, students could cope with distance learning [45], which means that it is possible to benefit from distance learning even in regular times.

6.4. Individual and Collaborative Work

The teachers designed tasks based on individual work for exploration activities, homework and summary tasks. In doing this, they used mainly GeoGebra and presentation applications. In addition, they designed tasks based on collaborative work for the solution of difficult problems, and for working with scientific ideas outdoors. The support of collaboration for problem solving has been reported in the literature. For example, Adolphus et al. [46] reported that there was a significant difference in problem solving abilities between students who participated in collaborative learning and those who used the conventional method. This difference was in favor of the group who used collaborative learning. In addition, designing tasks based on collaborative work for working with scientific ideas outdoors has been reported in the literature. For example, Daher and Baya’a [47] reported the work of middle school students on outdoor mathematical activities using mobile devices.

6.5. Communicational Processes

Communicational processes were used by the participating teachers for two goals. The first was to make students’ learning effective, and the second was to provide the teachers with resources. In our case, we argue that the teachers who participated in the present research could manage the distance learning communication using distance platforms, specifically mobile social networks, Zoom Rooms and the main Zoom session. This ability to manage communication is important for the success of distance learning, as the researchers pointed toward collaboration, enabled by communication, as enabling or hindering students’ building of knowledge. Klimova et al. [48] reported that the lack of social contact—which included the absence of collaboration between the teacher and students, and between the students themselves—resulted in little sharing and building of knowledge and experience by the students.

7. Conclusions, Recommendations and Limitations

This study reported the task design of mathematics and science teachers during the emergency education imposed on schools due to COVID-19. Using the didactic situation framework, we analyzed this design by focusing on different aspects of the didactic situation. The research results indicated that the participating teachers managed their teaching in the time of emergency education by different means. First, they attempted to use different digital resources, but sometimes they also used regular resources, such as the regular
textbook. Second, the teachers used strategies that helped to provide the students with the devolution of their learning; this devolution was investigated in the present research by considering autonomy, taking responsibility and decision making. These constructs are important as practices in a democratic society [49]. As such, distance education—even that which occurs in emergency education—could support an educational environment that encourage democratic practices, and could thus prepare the students for democratic society. This is in line with Martyushev et al. [50], who said that students often view online communication as a safe environment for self-expression and learning.

The present research results indicate that the mathematics and science teachers were concerned with autonomous, individual and communicational processes, more than other processes. At the same time, they were less concerned with making decisions as an educational practice. These results could be related to the socio-cultural aspect of education [51]. Although the teachers were concerned with autonomy, they were not interested in making decisions as a distinguished practice. The ministries of education should place emphasis on making decisions as a classroom practice that prepares the student—together with other practices, such as autonomy—for democratic life. In addition, the mathematics and science teachers did not differ regarding the didactical situation processes that they utilized in their task design, which could be due to the similar socio-cultural conditions under which they worked, and to the fact that both teach scientific disciplines. Future research is needed to study task design, in emergency education, by the teachers of the humanities and social studies.

The number of teachers who participated in the present research, fourteen, is acceptable because it enabled us to reach saturation [52], but quantitative research that depends on the present study is needed to give a broader picture about the task design practices of the whole population of mathematics and science teachers. This broad picture is related to different quantitative aspects, such as the difference in design processes according to the teachers’ experiences in technology integration in general, and in distance education in particular. In particular, quantitative research is needed to investigate how the various components in the design could affect students’ learning.

In addition to the above, the present research addressed qualitatively the task design of mathematics and science teachers. Future studies need to address, using qualitative methods, task design by teachers of other disciplines such as social studies or languages.

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**References**
1. Daher, W.; Sabbah, K.; Abuzant, M. Affective Engagement of Higher Education Students in an Online Course. *Emerg. Sci. J.* **2021**, *5*, 545–558. [CrossRef]
2. Daher, W. Middle school students’ motivation in solving modelling activities with technology. *Eurasia J. Math. Sci. Technol. Educ.* **2021**, *17*, em1999. [CrossRef]
3. Daher, W. Learning mathematics in the mobile phone environment: Students’ emotions. *J. Interact. Learn. Res.* **2011**, *22*, 357–378.
4. Daher, W.; Awawdeh Shahbari, J. Secondary students’ identities in the virtual classroom. *Sustainability* **2020**, *12*, 4407. [CrossRef]
5. Beluce, A.C.; Oliveira, K.L.D. Students’ Motivation for Learning in Virtual Learning Environments. *Paidéia* **2015**, *25*, 105–113. [CrossRef]

6. Simonsen, M.L.; Morningstar, M.E.; Xie, J. Student engagement in online and distance learning. In *Universal Design for Distance Education: A Guide for Online Course Development*; Scott, L.A., Thoma, C. A., Eds.; XanEdu: Ann Arbor, MI, USA, 2017.

7. Amer, A.; Daher, W. Moodle quizzes as a teaching tool in English for academic purposes course. *Int. J. Innov. Learn.* **2019**, *25*, 35–49. [CrossRef]

8. Hamdan, R.; Ashour, W.; Daher, W. the role of the e-learning departments in controlling the quality of electronic assessments in Palestinian universities during the COVID-19 pandemic. *Sustainability* **2021**, *13*, 12021. [CrossRef]

9. Jiménez-Bucarey, C.; Acevedo-Duque, A.; Müller-Pérez, S.; Aguilar-Gallardo, L.; Mora-Moscoso, M.; Vargas, E.C. Student’s satisfaction of the quality of online learning in higher education: An empirical study. *Sustainability* **2021**, *13*, 11960. [CrossRef]

10. Hodges, C.; Moore, S.; Locke, B.; Trust, T.; Bond, A. The difference between emergency remote teaching and online learning. *Educ. Rev.* **2020**, *27*, 1–12.

11. Tzafilkou, K.; Perifanou, M.; Economides, A.A. Development and validation of a students’ remote learning attitude scale (RLAS) in higher education. *Educ. Inf. Technol.* **2021**, *26*, 7279–7305. [CrossRef]

12. Makrakis, V.; Kostoulas-Makrakis, N. Online course design for a Joint M. Sc. Programme on ICT in education for sustainable development. In Proceedings of the 5th Conference on eLearning Excellence in the Middle East-Sustainable Innovation in Education, Dubai, United Arab Emirates, 30 January–2 February 2012; pp. 627–636.

13. Herrington, J.; Oliver, R.; Reeves, T.C. Authentic tasks online: A synergy among learner, task and technology. *Distance Educ.* **2006**, *27*, 233–248. [CrossRef]

14. Wang, Y. Task design in videoconferencing-supported distance language learning. *Calico J.* **2007**, *24*, 591–630. [CrossRef]

15. Chapelle, C. *Computer Applications in Second Language Acquisition: Foundations for Teaching, Testing and Research*; Cambridge University Press: Cambridge, UK, 2001.

16. Coman, C.; Turu, L.G.; Mesesan-Schmitz, L.; Staniciu, C.; Bularca, M.C. Online teaching and learning in higher education during the coronavirus pandemic: Students’ perspective. *Sustainability* **2020**, *12*, 10367. [CrossRef]

17. Valverde-Berrocoso, J.; Garrido-Arroyo, M.D.C.; Burgos-Videla, C.; Morales-Cevallos, M.B. Trends in educational research about e-learning: A systematic literature review (2009–2018). *Sustainability* **2020**, *12*, 5153. [CrossRef]

18. Leung, A.; Bolite-Frant, J. Designing mathematics tasks: The role of tools. In *Task Design in Mathematics Education*; Springer: Cham, Switzerland, 2015; pp. 191–225.

19. Jahreie, C.F.; Arnseth, H.C.; Krange, I.; Smørdal, O.; Kluge, A. Designing for play-based learning of scientific concepts: Digital tools for bridging school and science museum contexts. *Child. Youth Environ.* **2011**, *21*, 236–255.

20. Brousseau, G. *Theory of Didactical Situations in Mathematics: Didactique des Mathématiques, 1970–1990*; Kluwer Academic Publishers: New York, NY, USA, 2002.

21. Mackrell, K.; Maschietto, M.; Soury Lavergne, S. Theory of didactical situations and instrumental genesis for the design of a Cabri Elem book. In *Eighth Congress of European Research in Mathematics Education (CERME 8)*; Middle East Technical University: Ankara, Turkey, 2013; pp. 2654–2663.

22. Kisenlenk, K. Student’s beliefs about mathematics from the perspective of the theory of didactical situations. In *Mathematics–The French Way; Winsløw, C., Ed.; Center for Naturfagernes Didaktik: Copenhagen, Denmark, 2005;* pp. 83–96.

23. Jonsson, B.; Norqvist, M.; Liljekvist, Y.; Lithner, J. Learning mathematics through algorithmic and creative reasoning. *J. Math. Behav.* **2014**, *36*, 20–32. [CrossRef]

24. Lithner, J. A research framework for creative and imitative reasoning. *Educ. Stud. Math.* **2008**, *67*, 255–276. [CrossRef]

25. Artigue, M. Didactical engineering in mathematics education. In *Encyclopedia of Mathematics Education*; Lerman, S., Ed.; Springer: New York, NY, USA, 2014; pp. 159–162.

26. Brousseau, G.; Sarrazy, B.; Novotná, J. Didactic Contract in Mathematics Education. In *Encyclopedia of Mathematics Education*; Lerman, S., Ed.; Springer: Dordrecht, The Netherlands, 2014. [CrossRef]

27. Brousseau, G.; Warfield, V. Didactic Situations in Mathematics Education. In *Mathematics–The French Way*; Winsløw, C., Ed.; Center for Naturfagernes Didaktik: Copenhagen, Denmark, 2005; pp. 591–630. [CrossRef]

28. Lin, M.H.; Chen, H.G. A study of the effects of digital learning on learning motivation and learning outcome. *Eurasia J. Math. Educ. Sci. Technol. Educ.* **2017**, *13*, 3553–3564. [CrossRef]

29. Kozleski, E.B. The uses of qualitative research: Powerful methods to inform evidence-based practice in education. *Res. Pract. Pers. Sel. Disabil.* **2017**, *42*, 19–32. [CrossRef]

30. Tyson, P. Talking about lesson planning: The use of semi-structured interviews in teacher education. *Teach. Educ. Q.* **1991**, *1*, 87–96.

31. Karmina, S.; Dyson, B.; Watson, P.W.S.J.; Philpot, R. Teacher Implementation of Cooperative Learning in Indonesia: A Multiple Case Study. *Educ. Sci.* **2021**, *11*, 218. [CrossRef]

32. Mangiante-Orsola, C.; Perrin-Glorian, M.J.; Størenskag, H. Theory of didactical situations as a tool to understand and develop mathematics teaching practices. *NTNU Open* **2018**, *145–174.*

33. Etikan, I.; Musa, S.A.; Alkassim, R.S. Comparison of convenience sampling and purposive sampling. *Am. J. Theor. Appl. Stat.* **2016**, *5*, 1–4. [CrossRef]

34. Lincoln, S.Y.; Guba, E.G. *Naturalistic Inquiry*; Sage: Thousand Oaks, CA, USA, 1985.
35. Elo, S.; Kääriäinen, M.; Kanste, O.; Pölkki, T.; Utriainen, K.; Kyngäs, H. Qualitative content analysis: A focus on trustworthiness. *SAGE Open* **2014**, *4*, 2158244014522633. [CrossRef]

36. Moretti, F.; van Vliet, L.; Bensing, J.; Deledda, G.; Mazzi, M.; Rimondini, M.; Fletcher, I. A standardized approach to qualitative content analysis of focus group discussions from different countries. *Patient Educ. Couns.* **2011**, *82*, 420–428. [CrossRef]

37. Burmeister, E. Sample size: How many is enough? *Aust. Crit. Care* **2012**, *25*, 271–274. [CrossRef]

38. Polit, D.F.; Beck, C.T. *Nursing Research: Principles and Methods*; Lippincott Williams & Wilkins: Philadelphia, PA, USA, 2012.

39. Baya', N.; Daher, W.; Anabousy, A. The Development of In-Service Mathematics Teachers’ Integration of ICT in a Community of Practice: Teaching-in-Context Theory. *Int. J. Emerg. Technol. Learn.* **2019**, *14*, 125–139. [CrossRef]

40. Daher, W. Mathematics learning community flourishes in the cellular phone environment. *Int. J. Mob. Blended Learn.* **2010**, *2*, 1–17. [CrossRef]

41. Helwig, C.C.; Turiel, E. Rights, autonomy, and democracy: Children’s perspectives. *Int. J. Law Psychiatry* **2002**, *25*, 253270.

42. Nieuwelink, H.; Dekker, P.; Geijsel, F.; Ten Dam, G. Adolescents’ experiences with democracy and collective decision-making in everyday life. In *Political Engagement of the Young in Europe*; Routledge: London, UK, 2015; pp. 198–214.

43. International Society for Technology in Education (ISTE). ISTE Standards: Students. 2016. Available online: https://www.iste.org/standards/iste-standards-for-students (accessed on 30 December 2021).

44. Katz, A.; Kedem-Yemini, S. From classrooms to Zoom rooms: Preserving effective communication in distance education. *J. Inf. Technol. Case Appl. Res.* **2021**, *23*, 173–212. [CrossRef]

45. Berger, F.; Schreiner, C.; Hagleitner, W.; Jesacher-Rößler, L.; Roßnagl, S.; Kraler, C. Predicting coping with self-regulated distance learning in times of COVID-19: Evidence from a longitudinal study. *Front. Psychol.* **2021**, *12*, 3627. [CrossRef] [PubMed]

46. Adolphus, T.; Alamina, J.; Aderomun, T.S. The effects of collaborative learning on problem solving abilities among senior secondary school physics students in simple harmonic motion. *J. Educ. Pract.* **2013**, *4*, 95–100.

47. Daher, W.; Baya’a, N. Characteristics of middle school students learning actions in outdoor mathematical activities with the cellular phone. *Teach. Math. Appl. Int. J. IMA* **2012**, *31*, 133–152. [CrossRef]

48. Klimova, B.; Pikhart, M.; Cierniak-Emerych, A.; Dziuba, S. A Qualitative Analysis of Students’ Reflections on the Current Use of Digital Media in Foreign Language Classes. *Sustainability* **2021**, *13*, 9082. [CrossRef]

49. Breiner, P. Democratic Autonomy, Political Ethics, and Moral Luck. *Political Theory* **1989**, *17*, 550–574. [CrossRef]

50. Martyushev, N.; Shutaleva, A.; Malushko, E.; Nikonova, Z.; Savchenko, I. Online Communication Tools in Teaching Foreign Languages for Education Sustainability. *Sustainability* **2021**, *13*, 11127. [CrossRef]

51. Kostoulas-Makrakis, N. Emirati Pre-Service Teachers’ Perceptions of Europe and Europeans and Their Teaching Implications. *Int. Educ. J.* **2005**, *6*, 501–511.

52. Saunders, B.; Sim, J.; Kingston, T.; Baker, S.; Waterfield, J.; Bartlam, B.; Jinks, C. Saturation in qualitative research: Exploring its conceptualization and operationalization. *Qual. Quant.* **2018**, *52*, 1893–1907. [CrossRef]