Students' perceptions of formative assessments using Google Forms

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STUDENTS’ PERCEPTIONS OF FORMATIVE ASSESSMENTS USING GOOGLE FORMS

Abstract

Careful planning and implementation of using web tools to administer formative assessments is required to assure successful instruction (Cohen, & Sasson, 2016). Therefore, this study has examined the perceptions students have of using Google Forms as an online formative assessment in order to improve future instructional design. Specifically, this study has asked:

- What are grade 11 chemistry students' perceptions of using Google Forms as an online formative assessment?

Online formative assessments using Google Forms had several advantages: students got immediate feedback, students got to retry as often as they wanted, students were able to use any internet capable device and students were able to complete them at any time.

There were 24 participants recruited from a French grade 11 chemistry class at École Aux quatre vents. During the course of this research, data was collected from the online formative assessments of the last module of the chemistry course and students were invited to complete a survey that contained approximately 30 Likert-type statements which were delivered using Google Forms. All of the formative assessments’ data was analyzed and correlations with the perceptions survey and summative assessments were calculated to find tendencies and analyze the results. It was hypothesized that data would emerge and suggest better ways of using and implementing Google Forms as a formative assessment tool and hopefully determine if students found the use of Google Forms as an assessment to be beneficial.

The results have confirmed that students do feel that online formative assessments have improved their grade, that they are easy to complete and are not perceived as extra work or a burden. Also, this research has generated new ideas that will improve future online formative assessments and how they are administered.
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Introduction

Intro and Research Question

Formative assessment is a crucial element of any well constructed course (Lee, Feldman & Beaty, 2012; Shirley & Irving, 2015). It can help students determine their level of mastery, help teachers identify struggling students and provide many other benefits that teachers can integrate into everyday teaching and assessment (Baleni, 2015; Clinchot et al., 2017; Lee, Feldman & Beaty, 2012; Shirley & Irving, 2015). However, many teachers still find it a struggle to gather students’ work and to provide timely and appropriate feedback. New technologies can now alleviate some of these challenges (Lee, Feldman & Beaty, 2012). With this in mind, we can think of new ways of using technology to benefit students and teachers. This research has explored a specific way of administering online formative assessments and has gathered student feedback on that approach and their general perception about using online formative assessments. Specifically, it has answered the following research question:

- What are grade 11 chemistry students' perceptions of using Google Forms as an online formative assessment tool?

Relevance and Significance

Using Google Forms as an online formative assessment can provide many advantages. For example, students can get immediate feedback, they can retry as often as they want, they can use any internet compatible device and they can complete formative assessments at any time. There are also many advantages for teachers as well; Less marking time, more time in class, less revision time in class, quicker access to student performance results and access to analytics.

For this study, the focus was on students’ perceptions of online formative assessments. Also, this study has determined what students think of using Google Forms as an online
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Formative assessment and has determined how students will use and interact with it. For example, this study has determined how many students enjoyed online assessments using Google Forms and how many have liked and made use of the varying accessibility options. It has also studied what students found beneficial, how many students preferred the online method and determined if students found the assessments engaging or relevant. Hopefully, the data collected will be used to improve and continue the use of Google Forms as an online formative assessment.

In essence, the principle benefits of this study are to describe and quantify the perceptions students have of completing Google Forms formative assessments and to add to the body of knowledge of online formative assessments. Secondly, this study provides information and data that can contribute to the construction of improved online formative assessments for future students taking grade 11 chemistry.

Barriers and Issues

The first issue that must be discussed is regarding students who did not complete the online formative assessments. Even though some time was allocated in class for the completion of online formative assessments, it was the student’s responsibility to log on and complete them. Therefore, students’ autonomy and discipline were relied on to complete the online formative assessment assignments. Also, access to the online formative assessment during class time was not always guaranteed for all students at all times. Computers labs had to be reserved ahead of time and the classroom had only 8 tablets to access the internet. Lastly, the BYOD program was suspended by school administrators, and students were not allowed to use their mobile devices during class time to complete school work. However, the principal has provided to the
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researcher a permission form that waived the BYOD restriction for the chemistry class during the research period. Nonetheless, all of these conditions may have had an effect on the perceptions students had of online formative assessments.

Lastly, given that this study was conducted within a specific time frame and implemented within a specific module, students’ perceptions from previous modules may have created bias towards their perceptions of the studied module. However, the researcher feels confident that the data collected from this study still provides useful information and suggestions for further applications of online formative assessments using Google Forms.

Limitations and Delimitations

There were only 38 potential participants enrolled in the researchers grade 11 chemistry class which was team taught with another teacher. This small sample makes it difficult to generalize results to a larger population. Secondly, the researcher was the one in charge of formative assessments which made him directly involved in each step. This means, he was the one that explained the formative assessment procedure and guided the students in it’s completion. However, a colleague supervised the administration of the perceptions survey at the end of the module. Because of the researcher’s direct involvement, there was potential for a "power of effect". Students may have felt pressure or obligation to participate in the research. To alleviate this, students were informed that this research had no effect on their chemistry grade and that participation was voluntary. An informed consent letter and signature was collected before research began. They were also informed that their participation was anonymous and confidential. Hopefully these actions have reduced or eliminated student pressure to participate in the study.
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Other considerations were, students may have answered the same value for all questions in order to quickly complete the perceptions survey or students may not have provided honest opinions if they felt negatively about the online formative assessments or about their competency in the chemistry materials viewed during the research. Lastly, research was not about internet connection, the usability of Google Forms or finding the time to complete online quizzes.

**Definition of Terms**

The following definitions are provided to ensure uniformity and understanding of these terms throughout the study.

1. Online formative assessment: Assessments conducted using technology and the internet. Students have the opportunity to look over their mistakes and learn from them. For this study online quizzes and online homework are synonymous to online formative assessments.

2. BYOD: Bring Your Own Device is a program that schools possess which allows students to connect to the internet through the school’s Wi-Fi with their own personal devices.

**Summary**

Formative assessment plays a great role in student learning. It can be used to diagnose, evaluate, measure or classify a student’s achievement or performance (Clinchot et al., 2017). The arrival of computers has slowly steered teachers away from using pen and paper to complete formative assessments in a science classroom. However, it is the arrival of web 2.0 tools that really got science teachers excited about using technology to conduct formative assessments online. The next logical step was to determine what students think about this new practice and
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its approach. The data collected in this research has provided useful information regarding online formative assessments using Google Forms.

Review of the Literature

Formative Assessments

Formative assessments are an assortment of methods and activities teachers use to evaluate students’ learning, comprehension and progress throughout an activity, module or course (Shirley, & Irving, 2015). They can also help teachers identify specific areas students are struggling to learn (Clinchot et al., 2017). Moreover, formative assessments allow teachers to collect and analyse detailed information about students during the learning process in order to implement improvements on the lessons and adapt student activities before summative assessments are administered (Shirley, & Irving, 2015; Clinchot et al., 2017). Intervening this way with formative assessments increases student achievement in many educational contexts (Shirley, & Irving, 2015; Black, Harrison, Lee, Marshall, & Wiliam, 2004; Wiliam, Lee, Harrison, & Black, 2004). Furthermore, using technological tools and the internet in conjunction with formative assessments can further enhance student achievement (Shirley, & Irving, 2015). Lastly, Ruiz-Primo et al. (2010) have stated that “how teachers approach formative assessment influences students’ conceptual understanding, as well as their attitudes, motivation, and effort” (as cited in Clinchot et al., 2017, p. 70). Therefore, it is very important to have teachers that are convinced of the merits of formative assessments and use technology to deliver them in the goal of increasing and maximizing student learning and success.
In Search of a Formative Assessment Theory

Black and Wiliam have written many articles pertaining to formative assessments and are the authors predominantly cited by most researchers studying formative assessments. These authors have synthesized their body of work and searched the literature in an effort to develop a theory of formative assessment (Black & Wiliam, 2009).

In early works, Black (2003) and Wiliam (2000; 2007) stated that formative assessments centered on five main types of activity developed with and by teachers (as cited in Black & Wiliam, 2009):

- Sharing success criteria with learners
- Classroom questioning
- Comment-only marking
- Peer-assessment and self-assessment
- Formative use of summative tests

However, these are more synonymous with strategies teachers can use in class then an actual theory. Therefore, Black and Wiliam used the three key processes in learning and teaching suggested by Ramaprasad (1983) “in order to provide a better theoretical grounding for formative assessment (Black & Wiliam, 2009, p. 7):

- Establishing where the learners are in their learning
- Establishing where they are going
- Establishing what needs to be done to get them there

The authors go on further by suggesting five key strategies that will enable teachers to touch on the three key processes (Black & Wiliam, 2009, p. 8):
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1. Clarifying and sharing learning intentions and criteria for success
2. Engineering effective classroom discussions and other learning tasks that elicit evidence of student understanding
3. Providing feedback that moves learners forward
4. Activating students as instructional resources for one another
5. Activating students as the owners of their own learning

Because of its broad reach into many pedagogical theories and teaching strategies, I was unable to find one specific general theory of formative assessments or any other works in the literature that comes close to the body of work that the authors Wiliam and Black have produced over a many number of years. As such, the preceding strategies listed by Wiliam and Black are the closest thing to a theory of formative assessment that this literature review has produced.

Advantages of Online Formative Assessments

Formative assessments can be found in many forms and can be delivered in just about as many ways. However, this study was particularly interested in some of the advantages that an online formative assessment has to offer.

Online formative assessments can be used as a substitute for written homework. Most of these consist of multiple-choice or true-false questions (Cohen & Sasson, 2016). Several studies have found no statistical difference between final grades of students completing online graded homework and students completing paper based graded homework (Bonham, Beichner, & Deardorff, 2001; Fynewever, 2008). However, one significant difference between paper homework and online homework is teacher workload. Keeping the teacher’s workload at manageable levels while keeping students on task is another advantage of online formative
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assessments (Richards-Babb, Drellick, Henry, & Robertson-Honecker, 2011). Using self-correcting online formative assessments reduces a teacher’s workload even further (Richards-Babb, Drellick, Henry, & Robertson-Honecker, 2011). For students, it is very important to assign a grade to online formative assessments. Cheng, Thacker, Cardenas and Crouch (2004) have concluded in their study that graded online homework had significant improvements of understanding compared to a group that had ungraded online homework.

Saving time in and out of class gives teachers who use online formative assessments the time needed to look over data collected and aggregated by the online formative assessment computer program used. Gaining knowledge instantly about student learning will allow teachers to give faster feedback to students (Shirley, & Irving, 2015).

Online formative assessments can also serve as practice and review of class content (Cohen & Sasson, 2016). Additionally, the frequent use of online formative assessments can communicate to students what is important to retain and learn for the upcoming summative assessment (Black & Wiliam, 2009). It can also allow the possibility of students helping each other while they use online formative assessments as a guide to planning their own revision (Black & Wiliam, 2009).

Other Research

Cohen and Sasson examined if allowing many attempts on an online formative assessment that provided instant feedback served any benefit to students (2016). They concluded that it offered “an opportunity for students to take responsibility for their own learning” (Cohen & Sasson, 2016, p.189). Additionally, immediate feedback allowed and encouraged students to look back on their learning, rework their understanding and retake the
formative assessment to determine if they fully understood the knowledge gained (Cohen & Sasson, 2016). However, in their study, Kortemeyer, Kashy, Benenson and Bauer (2008) discussed the possibility that students take a trial and error approach to online formative assessments that allow for multiple attempts. The more attempts allowed, the higher the risk that students turn towards guessing instead of learning. Even so, Cohen and Sasson’s (2016) study reported that as much as 28% of participants had only attempted the online formative assessments once while all the others realized the advantages and were responsible in their learning and tried to achieve the best possible grade. Also, students had a positive attitude towards improvement from the first attempt at completing the formative assessment to the last (Cohen & Sasson, 2016). Unlike these researchers, this study has allowed unlimited attempts at completing the online formative assessments. However, to reduce the trial and error approach, 4 out of the 5 online formative assessments included several questions where students had to type in the answer.

Online formative assessments open up the possibility of allowing students to complete them at a time and place of their choosing (Cohen & Sasson, 2016). This study has maintained this practice and has allowed students to complete online formative assessments at a time that was convenient to them. It was important to allow students many opportunities to complete the online formative assessments because a significant correlation between formative assessments and the final exam grades can be attributed to the availability of learning with the online formative assessments (Cohen & Sasson, 2016). In essence, student performance on online formative assessment can become a good predictor of success in final summative evaluations (Richards-Babb, Drelick, Henry, & Robertson-Honecker, 2011).
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In an undergraduate chemistry course, Richards-Babb, Drelick, Henry and Robertson-Honecker (2011) found that student attitudes toward online formative assessment were generally positive with over 80% of participants and that an equal amount found online formative assessments were worth the effort, relevant to class materials, challenging and captivating. This study has determined if the same results can be obtained with high school students taking a chemistry course. Other results found with a student survey on perceptions of online formative assessments conducted by Richards-Babb, Drelick, Henry and Robertson-Honecker revealed that 63% of students completed the assignments because they were graded and 34.2% would have even if they were not graded. They also reported that at least 35% of participants admitted to guessing on the online formative assessments. The authors also found that most participants perceived online formative assessment as being helpful in making study habits consistent (75.6%), reducing the need for cramming (50.9%), preparing students better (53.9%) and completing more homework (77.2%). No negative effect on attitudes was reported (Richards-Babb, Drelick, Henry, & Robertson-Honecker, 2011). Lastly, 85.7% of participants strongly recommended that online formative assessments should be used in future classes (Richards-Babb, Drelick, Henry, & Robertson-Honecker, 2011).

**Contribution to the Field**

Students expect teachers to use technology when building knowledge and comprehension of a given subject like chemistry (Cohen & Sasson, 2016) and technology can easily be used outside of the classroom. In this study, it was hoped to determine if students would seize this opportunity. More specifically, it sought to learn how many students used online formative assessments outside of the classroom hours and with what frequency?
Most of the research reviewed was conducted in undergraduate classes or in non-chemistry high school classes. Furthermore, the online formative assessments had a time limit per session or a maximum number of attempts. This study has increased knowledge by conducting similar research in a grade 11 high school chemistry class and by allowing unlimited time per assessment and unlimited attempts per assessment. Lastly, perceptions of students were determined by using statements collected from Richards-Babb, Drelick, Henry and Robertson-Honecker (2011) and Cohen and Sasson (2016) measures used in their studies.

Self grading online formative assessments using Google Forms has only been available since 2016. Due to the recentness of this new function of the application, little to no research is available. This study adds to the little body of knowledge of this subject by conducting research with online formative assessments using self grading Google Forms with grade 11 chemistry students.

Summary

In conclusion, the literature provides a multitude of information in the area of online formative assessments: it allows students to increase their learning and achieve better performances on summative assessments; it allows teachers to save time and produce quicker feedback; it allows students to work and rework the material until mastery. As a result, students have good attitudes and opinions about the use of online formative assessments (Richards-Babb, Drelick, Henry, & Robertson-Honecker, 2011). However, there were still many facets of online formative assessments to study. What are the perceptions and academic results of students using online formative assessments that have no time limit or attempt limit? What are the perceptions
and academic results of those parameters on grade 11 chemistry students using Google Forms as an online formative assessment?

Methodology

Research Methods Employed

A quantitative cross-sectional survey design was used to collect data and analyze the following research question: “What are grade 11 chemistry students' perceptions of using Google Forms as an online formative assessment tool?” This type of research was the most suited to describe the attitudes, opinions and behaviors of the students that participated in this study (Creswell, 2012, p. 376). Furthermore, this type of research allowed the statistical analysis of the collected data to facilitate the identification of trends among participants’ perceptions and provides some insights into answering the research question (Creswell, 2012, p. 376). Additionally, a survey design has made correlational analysis between sets of specific statements from the survey and the data extracted from the formative and summative assessments easy to set up (Creswell, 2012, p. 376). Lastly, the window for data collection was very small and survey designs are ideal for gathering information in a short period of time (Creswell, 2012, p. 377).

The survey participants filled out was designed with quantitative statements adapted and selected from Richards-Babb, Drelick, Henry and Robertson-Honecker's study of online homework (2011) and Cohen and Sasson’s study of online quizzes (2016). These authors also conducted a survey to collect the opinions and attitudes of students regarding online homework and quizzes. This study’s research survey (Appendix A) contained 30 five level Likert Scale statements divided into three sections. Statement's pertained to understanding of chemistry, opinions, attitudes, habits and perceived affect (Richards-Babb, Drelick, Henry, & Robertson-
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Honecker, 2011). These were best suited to this research because their quantitative nature or ability to be quantified facilitated the interpretation of the data and the identification of trends in the population (Creswell, 2012, p. 376). Statements were not grouped into categories. Instead they were randomly distributed and related to mastery of learning, attitudes, beliefs, motivation and completion method. The French version, also located in Appendix A, was used with participants.

Specific Procedures Employed

**Participants.** There were 24 grade 11 chemistry students from Dalhousie New Brunswick’s French high school École Aux quatre vents who completed the study. These students, all of whom were 16 years of age, were enrolled in a chemistry class that the researcher team taught with another chemistry teacher. The class met once a day for 1 hour, over a period of five months.

Students have completed online formative assessments using Google Forms from the start of the semester. Nonetheless, data collection only started when the CBU ethic’s board had approved the research. District Scolaire Francophone Nord-Est does not have an ethics board and had advised the researcher to obtain permission from the school’s principal. Therefore, a meeting with the school’s principal was requested to present, explain and gain authorisation to conduct research within the grade 11 chemistry class and permission was granted.

**Recruitment and research period.** The chemistry class was invited to the school’s auditorium for a brief power-point presentation of the study (Appendix B), the consent form (Appendix C), the online assessments (Appendix D) and the perceptions questionnaire (Appendix A) on December 4th 2017.
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Students were given the consent forms at the end of the presentation and were invited to participate in the research by reading and signing the consent form. Parental consent was not required as the District Scolaire Francophone Nord-Est recognizes that students of 16 years of age or older are capable of giving their own consent. Weekly announcements were given during class to remind students who wished to participate to return their consent forms prior to beginning the study, for a period of 5 weeks. These announcements also stated that student participation was optional, voluntary and would not affect grade.

The consenting participants had data collected from their online formative assessments of module 4 completed between December 13th 2017 and January 19th 2018. They were also invited to completed the perceptions survey between January 10th 2018 and January 31st 2018. Non-participants still completed the online formative assessments to satisfy course requirement worth 10% of the final grade. However, their data and results were not used. Lastly, there was no grade attributed to the perceptions survey and there were no incentives offered to participate in the research.

Formative assessments. Students had already experienced online assessments in module 1 thru 3. Therefore, they were knowledgeable with how and where to complete the online assessments.

Five online formative assessments (Appendix D) containing 10 questions each were created using Google Forms in quiz mode which self corrects the quizzes and displays the results immediately after the students have completed the assessment. All of these were available online throughout module 4. Being available online has allowed students to complete them in class or at home. Students were allowed to complete the quizzes in class with 10 Samsung
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tables and students’ “Bring Your Own Device” devices or in a computer lab. At home, students could use any internet able device to complete the quizzes.

Students were instructed to complete the Goggle Forms online quizzes individually and without using class notes. However, students’ honesty and responsibility were the only factors that ensured this practice as enforcement was not feasible for students completing the quizzes at home. Also, students were allowed to retake the online quizzes as many times as they desired or until they achieved a grade they were satisfied with. Lastly, there was no time limits imposed in completing one single online quiz.

**Data collection.** The perceptions survey (Appendix A) was administered online via Google Forms, similarly to how the online formative assessments were administered. However, a free period in class was set aside for students who could not complete the survey at home or on their own devices. A colleague accompanied all the students to the computer lab. Students who chose not to participate or had already filled out the perceptions survey on their own time had a free period within the computer lab during this time. The computer lab was setup in such a way to prevent one student from seeing other students' work.

The research and the data collection process posed no physical risk to participants. However, there was minimal emotional risk to participants. To minimize these risks, anonymity was maximized by having a colleague supervise the survey data collection during class hours, with the researcher not present, to ensure anonymity of participants. Also, as stated earlier, the survey was available online for participants wishing to complete it at another time or at home. Furthermore, throughout the research period each student created a secret random number. This
number was added to the online formative assessments, the summative assessment and the perceptions survey by the student and used to match up the data.

There was also a risk of students seeing other students handing in their consent forms or students sharing their secret number with others. Nonetheless, participants are reassured that upon the release of the research findings, there was no identifiable information disclosed. Therefore, the identity of the participants was and is protected. All data is located securely and password protected in Google drive. Consent forms are stored in a locked filing cabinet in the researcher’s office at École Aux quatre vents. Access to consents forms, the survey spread sheet or the extracted data spreadsheet are only granted to the researcher.

Data Extraction and Analysis

Data from the online formal assessments, the summative assessment and the perceptions survey was extracted and matched up by participants’ secret number to facilitate analysis using an Excel or Google Sheets algorithm. From that point, students’ names were no longer visible to the researcher. There was a small risk that the researcher could inadvertently see a student's secret number during data extraction, however, this did not occur. An additional failsafe was also put in place where the secret number was composed of 6 to 8 digits or letters, which would have made remembering it difficult. If data extraction had failed, the researcher would have asked a colleague that does not know the students to open the excel files and delete the names column. Lastly, extracted formative assessment data that had no correspondent survey data was discarded and deleted.

Data analysis was conducted using some elements of Creswell's checklist for analyzing questionnaire data (2012). The first step was to determine the percentage of answered surveys in
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relation to the total number of potential participants. Secondly, the researcher analyzed each question and calculated the average and mean to identify potential general trends. Next, the researcher analyzed data to try and provide answers to the research questions. Lastly, the researcher presented a report that includes results, tables and graphs of each participant, question and observed correlation (Creswell, 2012).

Reliability and Validity

Reliability was determined by calculating the alpha coefficient, which gave an estimate on the consistency of each participants answers on the survey (Creswell, 2012, p. 161). It is important to note that statements were randomly distributed and that statements 2, 8, 19, 26 and 28 were negatively stated. The use of this method has removed the need for students to retake the survey at another time to determine reliability. As for validity, this study used survey items that have been used in similar studies. Using these studies as a reference and comparison point, the researcher was able to increase the validity of this study.

Summary

This study used a quantitative cross-sectional survey research design to collect data and analyze the following research question: “What are grade 11 chemistry students' perceptions of using Google Forms as an online formative assessment tool?”. To do so, 24 grade 11 chemistry students were recruited to answer a survey containing 30 Likert type statements which examined participants attitudes, opinions, motivations, perceptions and learning related to five online formative assessments created using Google Forms.

Lastly, a video presentation of the results was available to research participants via a private post on YouTube. Participants were made aware of the video via an announcement
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during their French course during the following semester, as the chemistry course had ended
before feedback or results will be available.

Research Findings

Introduction

This study anonymously examined 24 grade 11 chemistry students' perceptions of completing online formative assessments with Google Forms. This was done with the last module of the chemistry course. All of the students’ online formative assessments were logged, graded and timestamped by Google Forms. In addition, the grade from the module’s summative assessment and results from a perceptions survey were analysed to find common themes and trends. There were four key findings from the research: most of the students’ answers were polarized in the perceptions survey; students completing online formative assessments outside of class time increased; students taking extra attempts decreased while grade in chemistry module increased slightly; and finally, there appeared to be a weak to moderate correlation between several statements of the perceptions survey and the grades of the summative assessment.

Data Analysis

Data was collected through the online perceptions survey, online formative assessments and the paper summative assessment. The online formative assessments collected the time of day, the results and the answers of each participant’s attempt. The perceptions survey contained 30 statements using a 5-point Likert scale. Results from the summative assessments were transcribe to computer spreadsheets.

Data was analysed by doing the following: calculating the median of each statement on the perceptions survey to observe distribution; calculating the percentage of each measure for
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each statement on the perceptions survey to observe trends; calculating the Cronbach’s Alpha
coefficient to determine reliability; calculating the percentage of students who took extra
tries for each quiz to observe trends; calculating the percentage of students who took
attempts outside of class time for each quiz to observe trends; calculating and comparing quiz
grade averages between the first and the last attempt to observe trends; and lastly, calculating the
correlation coefficient of participants’ summative assessment results with each statement of the
perceptions survey to determine the strength of the correlations.

Findings

Polarized Perceptions Survey Distribution. Figure 1 shows the calculated median of
each statement found on the perceptions survey (Appendix A) participants fill out at the end of
the semester. Unabridged and translated statements are located in Appendix A. We can clearly
see on figure 1 many medians located at a 4 and a 5 which means that more than half of all
participants agreed or strongly agreed to those statements. To further scrutinize these findings,
statements were separated into 3 categories: heavy polarization of answers where 79% or more
of participants agreed or disagreed to the statements; light polarization of answers where 58% to
79% of participants agreed or disagreed to the statements; and a group that contained the
remaining statements which were not polarized towards agree or disagree. It is also important to
note that the reliability of the perceptions survey results (Appendix A) was calculated to be
0.865851 using the Cronbach Alpha coefficient method.
Figure 1. Survey statement median. This figure lists the median of each statement on the perceptions survey.
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Table 1 highlights the statements which received the highest rate of polarized answers. These statements are what a large majority of the participants perceived or felt about completing online formative assessment using Google Forms.

Table 1

<table>
<thead>
<tr>
<th>Statement on the perceptions survey</th>
<th>Disagree or strongly disagree</th>
<th>Neutral</th>
<th>Agree or strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: I completed all of the online formative assessments from module 4.</td>
<td>12.5%</td>
<td>4.2%</td>
<td>83.3%</td>
</tr>
<tr>
<td>3: I looked over the graded online formative assessments in order to learn from my mistakes.</td>
<td>8.3%</td>
<td>4.2%</td>
<td>87.5%</td>
</tr>
<tr>
<td>4: I generally understood the chemistry questions within the online formative assessments.</td>
<td>8.3%</td>
<td>12.5%</td>
<td>79.2%</td>
</tr>
<tr>
<td>7: For numerical questions, I worked out the answers with pencil and paper before submitting an answer within the online formative assessments assignment.</td>
<td>12.5%</td>
<td>8.3%</td>
<td>79.2%</td>
</tr>
<tr>
<td>9: The online formative assessments were relevant to what was presented during lecture.</td>
<td>12.5%</td>
<td>4.2%</td>
<td>83.3%</td>
</tr>
<tr>
<td>25: The online formative assessments were worth the effort.</td>
<td>8.3%</td>
<td>12.5%</td>
<td>79.2%</td>
</tr>
<tr>
<td>27: I recommend that the online formative assessments be used for future chemistry classes.</td>
<td>8.3%</td>
<td>8.3%</td>
<td>83.3%</td>
</tr>
<tr>
<td>30: I appreciated being able to complete the formative assessments at any time.</td>
<td>12.5%</td>
<td>0.0%</td>
<td>87.5%</td>
</tr>
<tr>
<td>8: I never tried to figure out my mistakes on questions I answered wrong within the online formative assessments.</td>
<td>87.5%</td>
<td>4.2%</td>
<td>8.3%</td>
</tr>
<tr>
<td>26: The online formative assessments were a waste of time.</td>
<td>83.3%</td>
<td>16.7%</td>
<td>0.0%</td>
</tr>
<tr>
<td>28: The online formative assessments did not further my understanding of chemistry concepts.</td>
<td>79.2%</td>
<td>8.3%</td>
<td>12.5%</td>
</tr>
</tbody>
</table>

Table 1. Percentage of participants who answered disagree or strongly disagree as compared to neutral and participants who answered agree or strongly agree. This table highlights statements with a heavy polarization of the agree/strongly agree and the disagree/strongly disagree.
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Table 2 highlights the statements which received a light polarization of answers. These statements are what a small majority of the participants perceived or felt about completing online formative assessment using Google Forms.

<table>
<thead>
<tr>
<th>Statement on the perceptions survey</th>
<th>Disagree or strongly disagree</th>
<th>Neutral</th>
<th>Agree or strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>2: I only completed the online formative assessments because they were worth a portion of my grade. (10%)</td>
<td>25,0%</td>
<td>8,3%</td>
<td>66,7%</td>
</tr>
<tr>
<td>11: The online formative assessments made me think more about chemistry than I would have otherwise.</td>
<td>16,7%</td>
<td>25%</td>
<td>58,3%</td>
</tr>
<tr>
<td>12: The deadlines for online formative assessments were helpful by encouraging me to study in a more consistent manner.</td>
<td>16,7%</td>
<td>20,8%</td>
<td>62,5%</td>
</tr>
<tr>
<td>16: I will receive a higher grade in chemistry due to my completion of the online formative assessments.</td>
<td>8,3%</td>
<td>29,2%</td>
<td>62,5%</td>
</tr>
<tr>
<td>18: Completing the online formative assessments helped me figure out my problems with the course material.</td>
<td>12,5%</td>
<td>25,0%</td>
<td>62,5%</td>
</tr>
<tr>
<td>20: I felt relaxed when I complete the online formative assessments.</td>
<td>16,7%</td>
<td>16,7%</td>
<td>66,7%</td>
</tr>
<tr>
<td>23: Overall, my experience with the online formative assessments was positive.</td>
<td>12,5%</td>
<td>16,7%</td>
<td>70,8%</td>
</tr>
<tr>
<td>29: I retook the formative assessments until I got a perfect grade.</td>
<td>20,8%</td>
<td>16,7%</td>
<td>62,5%</td>
</tr>
<tr>
<td>6: I guessed the answers to the online formative assessments assignments.</td>
<td>75,0%</td>
<td>16,7%</td>
<td>8,3%</td>
</tr>
<tr>
<td>14: I spent more time doing homework for this class than for any other class.</td>
<td>58,3%</td>
<td>25,0%</td>
<td>16,7%</td>
</tr>
<tr>
<td>19: Besides online formative assessments and laboratory work, I did none of the other homework recommended on the homework sheet.</td>
<td>62,5%</td>
<td>25,0%</td>
<td>12,5%</td>
</tr>
<tr>
<td>24: In the future, I would be less apt to take a course that included online formative assessments.</td>
<td>70,8%</td>
<td>25,0%</td>
<td>4,2%</td>
</tr>
</tbody>
</table>

Table 2. Percentage of participants who answered disagree or strongly disagree as compared to neutral and participants who answered agree or strongly agree. This table highlights the statements with a light polarization of the agree/strongly agree and the disagree/strongly disagree for each statement.
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Statements 5, 10, 13, 15, 17, 21 and 22 are not concentrated or polarized towards agree or disagree as other statements. Nonetheless, they are presented here in table 3 as contrast to the other statements of the perceptions survey.

Table 3

Percentage of participants who feel or perceive the following statements.

<table>
<thead>
<tr>
<th>Statement on the perceptions survey</th>
<th>Disagree or strongly disagree</th>
<th>Neutral</th>
<th>Agree or strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>5: I could complete the online formative assessments with little outside help. (friend, notes or other)</td>
<td>16,7 %</td>
<td>41,7 %</td>
<td>41,7 %</td>
</tr>
<tr>
<td>10: The online formative assessments were challenging.</td>
<td>33,3 %</td>
<td>37,5 %</td>
<td>29,2 %</td>
</tr>
<tr>
<td>13: I spent less time cramming for the chemistry test than I have for previous courses.</td>
<td>50,0 %</td>
<td>29,2 %</td>
<td>20,8 %</td>
</tr>
<tr>
<td>15: I received a higher score on the test due to my completion of the online formative assessments.</td>
<td>20,8 %</td>
<td>33,3 %</td>
<td>45,8 %</td>
</tr>
<tr>
<td>17: In preparation for the online formative assessment, I completed the related exercises.</td>
<td>25,0 %</td>
<td>20,8 %</td>
<td>54,2 %</td>
</tr>
<tr>
<td>21: I would have completed the online formative assessments even if they were not graded. (currently 10% of final grade)</td>
<td>41,7 %</td>
<td>12,5 %</td>
<td>45,8 %</td>
</tr>
<tr>
<td>22: I felt more prepared for my test this semester than for previous courses.</td>
<td>25,0 %</td>
<td>20,8 %</td>
<td>54,2 %</td>
</tr>
</tbody>
</table>

Table 3. Percentage of participants who answered disagree and strongly disagree as compared to neutral and participants who answered agree and strongly agree.

Working outside of class time. The online formative assessments were available for students to complete at any time 24 hours a day throughout module 4. Figure 2 shows the percentage of online quizzes that were attempted outside of class time. We can see that early on in the module not many attempts (15,7%) were made outside of class time. However, a steady increase from quiz 1 to quiz 5 is clearly visible in figure 2. The last quiz shows that 58,1% of attempts were completed outside of class time.
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![Percentage of students who have taken quizzes outside of class time](image)

*Figure 2. Percentage of students who have taken quizzes outside of class time.*

**If at first you don’t succeed.** The online formative assessments could be completed as many times as students desired. Figure 3 shows the percentage of students that completed each quiz more than once in an attempt to get a better grade. From quiz 2 to quiz 5, we see a decline in the number of attempts.

![Percentage of students who took extra attempts](image)

*Figure 3. Percentage of students who took extra attempts.*
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Figure 4 shows quiz averages between the first attempt and the last attempt of each quiz. Quiz 1 had 83.3% of students achieving maximum marks. Quiz 2 and 3, which had the most reattempts had 62.5% of students achieving maximum marks. Quiz 4 and 5 had 50% of students achieving maximum marks.

Correlations between the summative assessment and each statement of the perceptions survey. The correlation analysis did not reveal any strong correlations (0.7 or higher) between the summative assessment and each statement of the perceptions survey. However, several statements did have a weak to moderate calculated correlation and are listed in table 4. Statements 24 and 26 have negative correlations similar in strength to other positive correlation statements.
Table 4

Calculated correlation between the summative assessment and each statement of the survey.

<table>
<thead>
<tr>
<th>Perceptions survey statements</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>4: I generally understood the chemistry questions within the online formative assessments.</td>
<td>0.41</td>
</tr>
<tr>
<td>12: The deadlines for online formative assessments were helpful by encouraging me to study in a more consistent manner.</td>
<td>0.36</td>
</tr>
<tr>
<td>18: Completing the online formative assessments helped me figure out my problems with the course material.</td>
<td>0.36</td>
</tr>
<tr>
<td>21: I would have completed the online formative assessments even if they were not graded. (currently 10% of final grade)</td>
<td>0.40</td>
</tr>
<tr>
<td>23: Overall, my experience with the online formative assessments was positive.</td>
<td>0.36</td>
</tr>
<tr>
<td>24: In the future, I would be less apt to take a course that included online formative assessments.</td>
<td>-0.40</td>
</tr>
<tr>
<td>26: The online formative assessments were a waste of time.</td>
<td>-0.37</td>
</tr>
<tr>
<td>29: I retook the formative assessments until I got a perfect grade.</td>
<td>0.39</td>
</tr>
<tr>
<td>30: I appreciated being able to complete the formative assessments at any time.</td>
<td>0.40</td>
</tr>
</tbody>
</table>

Table 4. Correlation between summative assessment and perceptions survey.

**Summary of results**

This study examined grade 11 chemistry students' perceptions of using Google Forms as an online formative assessment tool by recording the times of day and the number of attempts students completed online formative assessments, compiling data from a perceptions survey and collecting grades from the online formative assessments and a summative assessment.

Major findings included the following: a polarization of statement answers; an increase from 15.7% to 58.1% of students completing the online formative assessment outside of class time from the first to the last quiz; a small grade increase throughout the chemistry module from...
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76% to 88% when comparing students’ first online quiz attempt to the last attempt; a general decrease in students’ extra attempts from 75% to 33,3% when omitting the first quiz; and several weak to moderate correlations (~±0,4) between the summative assessment and each statement of the perceptions survey.

Conclusion and Discussions

Conclusions/Discussions of Results

Describing and quantifying the perceptions students had of completing Google Forms formative assessments and adding to the body of knowledge of online formative assessments using a quantitative cross-sectional survey design were the principle benefits sought out by the researcher.

Formative assessments can potentially and significantly increase student achievement and learning (Shirley, & Irving, 2015; Black, Harrison, Lee, Marshall, & Wiliam, 2004; Wiliam, Lee, Harrison, & Black, 2004). They also have many other advantages for students and teachers. However, the main purpose of this study was to examine the following question:

- What are grade 11 chemistry students' perceptions of using Google Forms as an online formative assessment tool?

To do this, 24 participants from the French high school École Aux quatre vents completed 5 online formative assessments containing 10 chemistry questions, 1 online perceptions survey containing 30 Linkert-type statements and 1 paper summative assessment. All of the participants were allowed to complete the online formative assessments during class or during any free time they had outside of class. They were also allowed to attempt the online formative assessments as many times as they desired. Multiple attempts and immediate feedback
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allows and encouraged students to reflect on their attempt, rework their understanding and retake the online formative assessment (Cohen & Sasson, 2016). It is important to note that the formative assessments were worth 10% of students’ final grade and that this strategy increases students’ understanding of chemistry concepts (Cheng, Thacker, Cardenas, & Crouch, 2004). Alternatively, the perceptions survey did not have a grade and potential participants were advised that there would be no incentives offered to participate in the research.

**Perceptions Survey.** Student responses indicate a strong consensus among participants on the perceptions survey. Specifically, 23 out of the 30 statements of the perceptions survey had 58% or more of participants answering agree or strongly agree to positively phrased statements and answering disagree and strongly disagree to negatively phrased statements.

Interestingly there are 8 statements from this study that vary less than 5% when compared to a study on university students also enrolled in a chemistry course by Richards-Babb, Drellick, Henry and Robertson-Honecker (2011): students generally understood the chemistry questions (79%); students found quizzes relevant to class lecture (83%); students thought quizzes were worth the effort (79%); students recommended using quizzes in future classes (83%); quizzes furthered understanding of chemistry (79%); students completed quizzes because they were worth a portion of their grade (67%); students would take more classes that included online quizzes (71%); students felt more prepared for tests this semester (54%). These statements underline well that online formative assessments are beneficial and worth pursuing. This level of similarity may seem strange when considering that high school students may not have the same level of maturity, responsibility and persistence as university students. Nonetheless, these commonalities help to validate the findings of this research.
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Lastly, 83.3% of participants strongly recommended that online formative assessments be used in future classes, which is comparable to Richards-Babb, Drellick, Henry and Robertson-Honecker study (2011) in which 85.7% of participants claimed the same.

**Working outside of class time.** A steady increase from 15.7% to 58.1% of students completing online formative assessment outside of class time from quiz to quiz was clearly visible in the data. This increase could be attributed to students having greater workloads in chemistry and other classes near the end of the semester. Perhaps different results would have occurred if this study had been conducted at other times in the semester. Nonetheless, this highlights the importance of having online formative assessments available to students especially near the end of the semester. With this in mind, it is my recommendation that a teacher who can’t have online formative assessments throughout the course should concentrate them at the end of the semester.

**Multiple attempts.** An average increase of 12% in quiz grades throughout the chemistry module was found when comparing students’ first attempt with the last attempt. This makes sense because students would learn from their mistakes and succeed in getting more correctly answered questions on subsequent attempts. Cohen and Sasson found a 30% grade increase in their study of online quizzes with university students in a physics course (2016). Perhaps paying for education at the university level motivated those students to improved their grade more than the high school students. Quiz one recorded a low number of attempts because it was a little easier than the others. Omitting the first quiz, there was a decrease in student reattempts from the second quiz to the last. I believe students would become satisfied with their overall grade and accepted a lower grade instead of learning and trying until maximum marks. Students
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essentially took responsibility for their own learning (Cohen, & Sasson, 2016) and became content with the level of achievement they had attained. So much so that only 50% of participants attained maximum marks for quiz 4 and quiz 5. I recommend increasing the value of each quiz throughout the module to help students avoid becoming complacent about their learning and grade. For example, having quiz 1 worth 5%, quiz 2 worth 10%, quiz 3 worth 15%, quiz 4 worth 30% and quiz 5 worth 40% of the total marks that make up the 10% of the final grade. Such a grade scale could avoid some potential lax near the end of the module. However, there is a great risk that students’ grades could drop significantly compared to equal proportions grade if students’ attempts do not increase.

Correlations between the summative assessment and each statement of the perceptions survey. Several weak to moderate correlations (~ ±0.4) were found between the 5-point Linkert scale statements of the perceptions survey answers and the students’ summative assessment grades. Students that performed better on the summative assessment felt they had a positive experience with the quizzes, good study habits and a good understanding of chemistry concepts. They also believe that completing the online formative assessments was a good use of their time and helped with their understanding of the course material. It is no surprise that these students took the quizzes until they got a good grade and would have completed the quizzes even if they were not graded. Lastly, these students appreciated being able to complete the quizzes at a time of their choosing and would be inclined to take a course with online formative assessments in the future. In Contrast, students who performed poorly thought the opposite. This makes sense as it is reasonable to think that individual outcomes could impact the perception of online formative assessments. In my opinion, there is one statement from the perception survey
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that stands out for poor performing students: did not appreciate being able to complete the formative assessments at any time (Appendix A). This seems counter intuitive, as one would think that students who performed poorly would have appreciated this feature. This is, however, a weak to moderate correlation and could be invalidated due to the small number of participants.

These correlations seem to indicate that online formative quizzes are a great idea, a positive experience, something to continue and use with future grade 11 chemistry classes. Nevertheless, it would be a good idea to create special features for the online formative assessments to help struggling students see the value and benefits these activities can have on their learning and achievement. Additionally, to have special sessions outside of class to encourage and structure quiz time. Even though these steps would be beneficial to the whole class, they would be more so for struggling students.

Implications

The principal aims of this study were to determine the perceptions of students and to add to the body of knowledge of online Google Forms formative assessments. Furthermore, this study can serve as an information platform for educators interested in using online formative assessments.

Using online methods to deliver formative assessment in a high school setting where BYOD is available has become extremely important. Almost every student has access to a smart phone, tablet or another portable device. Most of these students see these devices as extensions of themselves. In this researcher’s opinion, being able to connect with students about class materials through these devices can further increase motivation, interest and learning in chemistry. By understanding how students feel and perceive the use of online formative
assessments through these devices, teachers can start to learn how to better create and deliver them. Furthermore, student performance on online formative assessments are a good predictor of student overall success in a class (Richards-Babb, Drelick, Henry, & Robertson-Honecker, 2011). Therefore, it is not only important to have formative assessments, but to deliver them through a medium students are comfortable with, familiar with and use on a daily basis. Hopefully, this study can offer information and insight to help teachers get started in offering online formative assessment in their classes.

**Suggestions for Further Research**

Even though this research provides a lot of quantitative data regarding the perceptions of students using online formative assessments, there are many other groups, variables and parameters to explore when conducting research of online formative assessments. Here are a few suggestions:

- Qualitative section on the perceptions survey
- Study spanning the semester instead of one module
- Study including different classes, grade levels, schools or languages
- Analysis of which times of the day are most used
- Why do students not take extra attempts?
- Why do students not strive for the maximum marks?
- Study on students creating their own online formative assessments
- Study on the perceptions of teachers using online formative assessments with students
- Study of online formative assessment question type, disposition and frequency
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Summary

This study examined student habits and perceptions of online formative assessments using Google Forms. Specifically, how many attempts on each quiz students would make, how often they would use Google Forms outside of class time and their overall impressions and attitudes regarding online formative assessments. Participants were asked to complete 5 online quizzes, 1 summative assessment and a cross-sectional quantitative perceptions survey. Also, all 24 participants were recruited from a pool of 16-year-old students all taking a grade 11 chemistry course in a New-Brunswick French high school. Findings suggest that learning can be improved by allowing multiple and any time attempts. Moreover, that the vast majority of students felt that online formative assessments were relevant, worth the effort and improved their learning. Most of the participants also agreed that they would be inclined to take another course that used online formative assessments. Lastly, the body of knowledge collected by this research can serve educators in the construction and implementation of online formative assessments using Google Forms.
Personal Reflection

I really enjoyed conducting this research and I liked that it allowed me to create class materials that I can use with future classes.

I was surprised that 36 out of my 38 students returned the consent form. I did not think so many would be interested in participating in my study. However, only 24 perceptions survey were filled out. 12 students anonymously opted out. It was difficult to motivate and encourage the remaining students to fill out the perceptions survey when I did not know who they were. In retrospect, the anonymous component was not necessary since I am only presenting my results to my CBU class, the participants and 2 of my colleagues. Therefore, I could have saved myself a lot of effort. As for the students that opted out, I suspect that they are among a handful of students that did not complete the online formative assessments and therefore had no experience to write about. Also struggling students did not have good results on the quizzes and may have opted out of the perceptions survey.

In retrospect I collected much more data than I needed and therefore many other statistical analyses could have done. For example, those relating to correlations between sets of data or analyse the time of day of quiz completions. However, due to the limitation placed on the length of this paper, the choice was made to only use specific findings.

Though I had a desire to tell my students to use the quizzes as review for the summative assessments near the end of the module as it would have been a great review exercise, I did not as this would have polluted the results of my study.

One thing is for certain, this experience has allowed me to implement more formative assessments in the semester than I would have normally. I used to give about 4 or 5 formative
assessments in the semester and I found it to be a lot. This semester I gave 23 online formative assessments with the last 5 being part of the research. I have a gut feeling that my class’ academic results are better than the year before, though at this time I am unable to compare with other classes as I only teach Chemistry once a year. Interestingly, I have had a handful of students requesting that I make similar online quizzes for the physics course that am currently teaching. I would have never guessed that students would really like doing these quizzes, especially high school students. Perhaps these requests are in part a way to gain access to their phones during class but nonetheless, the reality is that having access to online assessment has had a positive impact on learning in my class.
References


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Appendix A: Survey Questions

Below are the questions that will appear on the survey. However, it will not be a paper survey. The survey will be delivered using Google Forms, the same method used for the formative assessments. Questions are adapted from Richards-Babb, Drelick, Henry and Robertson-Honecker’s study of online homework (2011) and Cohen and Sasson’s study of online quizzes (2016).

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: I completed all of the online formative assessments from module 4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2: I only completed the online formative assessments because they were worth a portion of my grade. (10%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3: I looked over the graded online formative assessments in order to learn from my mistakes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4: I generally understood the chemistry questions within the online formative assessments.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5: I could complete the online formative assessments with little outside help. (friend, notes or other)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6: I guessed the answers to the online formative assessments assignments.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7: For numerical questions, I worked out the answers with pencil and paper before submitting an answer within the online formative assessments assignment.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8: I never tried to figure out my mistakes on questions I answered wrong within the online formative assessments.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>9: The online formative assessments were relevant to what was presented during lecture.</td>
<td></td>
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<tr>
<td>10: The online formative assessments were challenging.</td>
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<tr>
<td>11: The online formative assessments made me think more about chemistry than I would have otherwise.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>12: The deadlines for online formative assessments were helpful by encouraging me to study in a more consistent manner.</td>
<td></td>
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</tr>
<tr>
<td>13: I spent less time cramming for the chemistry test than I have for previous courses.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>14: I spent more time doing homework for this class than for any other class.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>15: I received a higher score on the test due to my completion of the online formative assessments.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16: I will receive a higher grade in chemistry due to my completion of the online formative assessments.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>17: In preparation for the online formative assessment, I completed the related exercises.</td>
<td></td>
<td></td>
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<tr>
<td>18: Completing the online formative assessments helped me figure out my problems with the course material.</td>
<td></td>
<td></td>
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<tr>
<td>19: Besides online formative assessments and laboratory work, I did none of the other homework recommended on the homework sheet.</td>
<td></td>
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</tr>
<tr>
<td>20: I felt relaxed when I complete the Online formative assessments.</td>
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<tr>
<td>21: I would have completed the online formative assessments even if they were not graded. (currently 10% of final grade)</td>
<td></td>
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<tr>
<td>22: I felt more prepared for my test this semester than for previous courses.</td>
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<tr>
<td>23: Overall, my experience with the online formative assessments was positive.</td>
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<tr>
<td>24: In the future, I would be less apt to take a course that included online formative assessments.</td>
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<tr>
<td>25: The online formative assessments were worth the effort.</td>
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<tr>
<td>26: The online formative assessments were a waste of time.</td>
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<tr>
<td>27: I recommend that the online formative assessments be used for future chemistry classes.</td>
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</tbody>
</table>
## STUDENTS' PERCEPTIONS OF FORMATIVE ASSESSMENTS USING GOOGLE FORMS

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 28 | The online formative assessments did not further my understanding of chemistry concepts. |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 29 | I retook the formative assessments until I got a perfect grade. |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 30 | I appreciated being able to complete the formative assessments at any time. |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

<table>
<thead>
<tr>
<th>Déclaration</th>
<th>Fortement en désaccord</th>
<th>En désaccord</th>
<th>Neutre</th>
<th>En accord</th>
<th>Fortement en accord</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: J'ai complété tous les quiz du module 4.</td>
<td></td>
<td></td>
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<tr>
<td>2: J'ai seulement complété les quiz parce qu'ils valaient une partie de ma note. (10%)</td>
<td></td>
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<tr>
<td>3: J'ai regardé les résultats des quiz afin d'apprendre de mes erreurs.</td>
<td></td>
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<tr>
<td>4: J'ai généralement compris les questions de chimie sur les quiz.</td>
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<tr>
<td>5: J’ai pu compléter les quiz avec peu d’aide extérieure. (Ami, notes ou autre)</td>
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<tr>
<td>6: J'ai deviné les réponses aux questions des quiz.</td>
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<tr>
<td>7: Pour les questions avec calculs, j'ai travaillé avec papier-crayon avant de donner une réponse sur le quiz.</td>
<td></td>
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<tr>
<td>8: Je n'ai jamais essayé de comprendre mes erreurs sur les questions que j'ai répondu incorrectement sur les quiz.</td>
<td></td>
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<tr>
<td>9: Les quiz étaient pertinents (relié) à ce qui a été présenté pendant le cours.</td>
<td></td>
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<tr>
<td>10: Les quiz ont été difficiles.</td>
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<tr>
<td>11: Les quiz m'ont fait penser davantage à la chimie.</td>
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<tr>
<td>12: Les dates pour la complétion des quiz ont été utiles pour m’encourager à étudier de manière plus structurer.</td>
<td></td>
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<tr>
<td>13: J'ai passé moins de temps à étudier pour le test de chimie que pour les tests précédents.</td>
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<tr>
<td>14:</td>
<td>J'ai passé plus de temps à faire mes devoirs pour cette classe que pour n'importe quelle autre classe.</td>
<td></td>
<td></td>
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<tr>
<td>15:</td>
<td>J'ai reçu une note plus élevée sur le test à cause des quiz.</td>
<td></td>
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</tr>
<tr>
<td>16:</td>
<td>J'aurai une meilleure note en chimie à cause que j’ai fait les quiz.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17:</td>
<td>J'ai fait les numéros du devoir pour me préparer à faire les quiz.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18:</td>
<td>Faire les quiz m'a aidé à comprendre mes défis avec la matière du cours.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19:</td>
<td>Autres que les quiz et les travaux de laboratoire, je n'ai pas fait les autres devoirs demandés.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>20:</td>
<td>Je me suis senti détendu (relax) quand je terminais mes quiz.</td>
<td></td>
<td></td>
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<tr>
<td>21:</td>
<td>J'aurais fait les quiz même si elles ne comptaient pas. (Actuellement 10% de la note finale)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22:</td>
<td>Je me sentais plus préparé pour mon test ce semestre que pour les cours précédents.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>23:</td>
<td>Dans l'ensemble, mon expérience avec les quiz était positive.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>24:</td>
<td>À l'avenir, je serais moins tenté de suivre un cours qui inclus des quiz en ligne.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>25:</td>
<td>Les quiz valaient l'effort.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26:</td>
<td>Les quiz ont été une perte de temps.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27:</td>
<td>Je recommande que les quiz soient utilisés pour les futures classes de chimie.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28:</td>
<td>Les quiz n'ont pas approfondi ma compréhension des concepts de chimie.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29:</td>
<td>J'ai repris les évaluations formatives jusqu'à ce que j'obtienne une note parfaite.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30:</td>
<td>J'ai apprécié être capable de faire les quiz n'importe quand. (maison, pause, fin de semaine)</td>
<td></td>
<td></td>
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</tbody>
</table>
Les perceptions d’élèves lors de l’utilisation de Google Forms pour des évaluations formatives.

Description de l’étude
Le but de cette étude est de déterminer les perceptions que les élèves du cours de chimie 11 développent après l’utilisation de Google Forms pour compléter les évaluations formatives (Quiz) pendant le module 4. Il est mon souhait de découvrir des tendances au sujet des perceptions reliées aux bénéfices, aux préférences, aux pertinences, à l’engagement, à la motivation, aux attitudes, aux opinions, aux comportements et au rendement scolaire qui me guideront dans la construction de meilleur évaluations formatives en ligne.
Participants Vs Non-participants

- Non-Participants
  - Doivent compléter les évaluations formatives en ligne (Quiz)
  - Doivent compléter l'évaluation sommative (test)
  - Ceux-ci comporte un percentage vers la note finale
- Participants
  - Ferons tous les points des non-participants
  - Compléteront un questionnaire en ligne qui portera sur leurs perceptions et leurs expériences lors de l'utilisation de Google Forms pour des évaluations en ligne.
  - Donneront leur consentement pour extraire les données de leurs évaluations formatives
  - Donneront leur consentement pour extraire les données de leur évaluation sommative

Appendix B.: Presentation to potential participants (My data)

Est-ce que je dois participé?

- Cette étude est volontaire
- Il n’y aura aucune conséquences pour les non-participants
- Il n’y a pas d’incitativa pour les participants
- Il n’y a pas de note attribué au sondage
- Cette étude ne vous met pas en danger physique ou émotionnel

Appendix B.: Presentation to potential participants (My data)
Lire et revoir la feuille de consentement

But de l’étude:
- Les étudiants ont participé à des activités de formative assessment telles que des tests, des quiz, des commentaires de professeurs et des commentaires de pairs. Les scores de ces activités ont été conservés et analysés. Les informations recueillies ont été utilisées pour évaluer l’efficacité de la formative assessment.

Exemple de question sur le sondage:

1. J'ai accompli toutes les évaluations formatives en ligne.
   - [ ] Fortement en désaccord
   - [ ] En désaccord
   - [ ] Neutre
   - [ ] En accord
   - [ ] Fortement en accord

2. J'ai seulement accompli les évaluations formatives en ligne parce qu'elles valaient une partie de ma note.
   - [ ] Oui
   - [ ] Non

   - [ ] Oui
   - [ ] Non

   - [ ] Oui
   - [ ] Non

Nom du parent: __________________________
Date: __________________________
Signature du parent: __________________________

Identifiez-vous comme étant un(e) enseignant(e) sans aucun autre parent(s) identifié(e) en dessous de vous.

Appendix B: Protocole d’étude et consentement (lien: [lien])

Appendix C: Exemple de questionnaire (lien: [lien])
STUDENTS' PERCEPTIONS OF FORMATIVE ASSESSMENTS USING GOOGLE FORMS

Questions?

Merci!
Appendix C: Consent Form

Students' views of online formative assessments using Google Forms

Research Purpose
This research will attempt to answer the following question:
- What are grade 11 chemistry students’ perceptions of using Google Forms as an online formative assessment tool?

Researcher
André-Marc Cormier
(506) 684-1228 or Cbu15fxj@cbu.ca (home)
(506) 684-7610 or Cormian@nbed.nb.ca (work)

Supervisor
Dr. Kathy Snow
(902) 563-1170 or kathy_snow@cbu.ca

Research Description
This study’s aim is to determine the perceptions students have of using Google Forms as an online formative assessment. Hopefully, I will discover tendencies from students’ perceptions of benefits, relevance, preference, level of engagement, level of motivation, attitudes, opinions, behaviors and level of learning that will guide me in the construction of better online formative assessments in the future.

All students in the grade 11 chemistry class at École Aux quatre vents, will be given random numbers to identify online formative assessments, summative assessment and a perceptions survey. Students that accept to participate in the study will anonymously submit their random number. Using this random number, statistical data from the last chemistry module shall be extracted from the results of the online formative assessments, the summative assessment and the perceptions survey. This will allow participant anonymity. A student can for example, sign this consent letter and then later change their mind by not submitting their assigned secret random number. Furthermore, a student’s name, age, identity or any other identifier will not be collected or used in the study.

The online formative assessments and the summative assessment are mandatory for all students. These are part of the course requirements. The consent form gives permission to the researcher to extract the data from the above and to administer the perceptions survey.

The perceptions survey is an optional questionnaire that contains about 30 Likert-type questions. This is the main instrument used in this study. There is no grade attributed to the perceptions survey and there will be no incentives offered to complete it.

All information collected will be confidential and will only be used as part of this study being carried out by André-Marc Cormier, a research student enrolled at Cape Breton University. Furthermore, all data collected will be stored in a secure digital location for no longer than 2 years. Access to questionnaire and extracted data will only be available to André-Marc Cormier. Data, when reported, will be in aggregate form. No personally identifiable information will be given out at any time.
Lastly, this research poses no physical risk and very minimal emotional risk in the form of “power of effect”.

As a participant, I understand that:

- I am not obligated to participate because I am enrolled in the class.
- I am not obligated to participate because my teacher has asked me.
- My identity and data will be kept anonymous and confidential as described above.
- I am free to withdraw from the study at any time before, during, or after, without reason or consequence. However, I will be unable to withdraw once data analysis has started because the researcher will no longer be able to identify a specific participant’s data.
- I have been told the purpose of the experiment and I am free to ask questions at any time.
- I maintain my legal rights and they are never waived during the course of this research.
- I may take any complaints or concerns I may have to the researcher at the above coordinates or to one of the REBs listed below.
- I will be able to view results of the study via a video hosted on YouTube.
- The results will be shared with the researcher’s peers in the CBU 5800 applied research project course and with other teachers at my school.

**Informed Consent**

I have read this letter and freely consent to participate in this research.

Participant's Name: ________________________________

Participant’s Signature: __________________ Date: _________

I have read this letter and freely consent my child to participate in this research.

(For students under the age of 16 in the province of New Brunswick)

Parent’s Name: ________________________________

Parent’s Signature: __________________ Date: _________

If you have any questions that have not been answered satisfactorily by the researcher(s) or supervisor(s) named above, please contact the Vice-Chair of the Research Ethics Board at Cape Breton University, John Hudec, at (902) 563-1982 or email [John_hudec@CBU.ca](mailto:John_hudec@CBU.ca)

Note: Participants are to be informed of the researcher’s “Duty to disclose” suspected abuse or neglect of a child or an adult in need of protection. Under section 30(1), New Brunswick’s Family Services Act, states that “Any person who has information causing him to suspect that a child has been abandoned, deserted, physically or emotionally neglected, physically or sexually illtreated, including sexual exploitation through child pornography or otherwise abused shall inform the Minister of Families and Children of the situation without delay.”.
Perceptions des élèves sur l’évaluation formative en ligne à l’aide de Google Forms

But de la recherche
Cette recherche tentera de répondre à la question suivante:

- Quelles sont les perceptions des élèves en chimie 11e année sur l’utilisation de Google Forms comme outil d’évaluation formative en ligne?

Chercheur
André-Marc Cormier
(506) 684-1228 ou Cbu15fxj@cbu.ca (maison)
(506) 684-7610 ou Cormiand@nbed.nb.ca (travail)

Superviseur
Dr. Kathy Snow
(902) 563-1170 ou kathy_snow@cbu.ca

Description de la recherche
L'objectif de cette étude est de déterminer les perceptions qu'ont les élèves après avoir utilisé Google Forms comme outil d'évaluation formative en ligne. J'espère découvrir des tendances tel que les avantages, les préférences, le niveau d'engagement, le niveau de motivation, les attitudes, les opinions, les comportements et le niveau d'apprentissage des élèves qui m'aideront dans la construction de meilleures évaluations formatives en ligne.

Tous les élèves du cours de chimie 11e année de l'École Aux quatre vents recevront des nombres aléatoires pour identifier leurs évaluations formatives en ligne, leur évaluation sommative et leur sondage sur les perceptions. Les élèves qui accepteront de participer à l'étude soumettront anonymement leur nombre aléatoire. En utilisant ce nombre aléatoire, des données statistiques du dernier module de chimie seront extraites des évaluations formatives en ligne, de l'évaluation sommative et de l'enquête sur les perceptions. Cela permettra l'anonymat des participants. Un étudiant peut, par exemple, signer cette lettre de consentement et ensuite changer d'avis en ne soumettant pas son numéro aléatoire secret attribué. De plus, le nom, l'âge, l'identité ou tout autre identifiant d'un élève ne sera pas recueilli ou utilisé dans l'étude.

Les évaluations formatives en ligne et l'évaluation sommative sont obligatoires pour tous les étudiants. Cela fait partie des exigences du cours. Le formulaire de consentement donne la permission au chercheur d'extrahir les données de celles-ci et d'administrer l'enquête sur les perceptions.

L'enquête sur les perceptions est un questionnaire facultatif qui contient environ 30 questions de type Likert. C'est l'instrument principal utilisé dans cette étude. Aucune note n'est attribuée au sondage sur les perceptions et aucune mesure incitative sera offerte pour l'achever.

Toutes les informations recueillies seront confidentielles et seront utilisées que dans le cadre de cette étude réalisée par André-Marc Cormier, un étudiant en recherche inscrit à l'Université du Cap-Breton. En outre, toutes les données collectées seront stockées dans un emplacement numérique sécurisé pour une durée maximale de deux ans. L'accès au questionnaire et aux données extraites sera seulement accessible à André-Marc Cormier. Les données, lorsqu'elles sont déclarées, seront sous forme agrégée. En tout temps, aucune information personnelle sera divulguée.

Enfin, cette recherche ne présente aucun risque physique et un risque émotionnel très minime sous forme de « pouvoir d’effet ».
Comme participant, je comprends que:

- Je ne suis pas obligé de participer parce que je suis inscrit au cours.
- Je ne suis pas obligé de participer parce que mon professeur m’a demandé.
- Mon identité et mes données seront maintenues anonymes et confidentiels tel que décrit ci-dessus.
- Je suis libre de retirer ma participation à la recherche en tout temps avant, pendant ou après l’étude sans raison ou conséquences. Cependant, je ne serai pas en mesure de me retirer une fois que l’analyse des données aura commencé car le chercheur ne pourra plus identifier les données d’un participant spécifique.
- J’ai été dit l’intention de la recherche et je peux poser des questions à tout moment.
- Je maintiens mes droits légaux et ils ne sont pas renoncé pendant la période de l’étude.
- Je peux adresser toute plainte ou préoccupation au chercheur au coordonnées ci-haut ou à un des REBs listé ci-bas.
- Les résultats seront partagés avec les pairs du chercheur dans le cadre du cours de recherche appliquée CBU 5800 et avec d’autres enseignants de mon école.

Consentement Informé

J'ai lu cette lettre et je consens librement à participer à cette recherche.

Nom du participant: ____________________________________________

Signature du participant: ______________________ Date: ____________

J'ai lu cette lettre et j'autorise librement mon enfant à participer à cette recherche.

(Pour les étudiants de moins de 16 ans dans la province du Nouveau-Brunswick)

Nom du parent: ____________________________________________

Signature du parent: ______________________ Date: ____________

Si vous avez des questions auxquelles les chercheurs ou les superviseurs nommés ci-dessus n'ont pas répondu de façon satisfaisante, veuillez communiquer avec John Hudec, vice-président du Comité d'éthique de la recherche de l'Université du Cap-Breton, au (902) 563-1982 ou par courriel John_hudec@CBU.ca

Note: Les participants doivent être informés de « l’obligation de divulguer » du chercheur soupçonné d'abus ou de négligence envers un enfant ou un adulte ayant besoin de protection. En vertu du paragraphe 30 (1), la Loi sur les services à la famille du Nouveau-Brunswick stipule que « Toute personne qui a des renseignements l'amenant à soupçonner qu'un enfant a été abandonné, négligé physiquement ou émotionnellement, maltraité physiquement ou sexuellement, y compris l'exploitation sexuelle au moyen de pornographie juvénile ou autrement maltraité doit informer le ministre de la famille et des enfants de la situation sans délai. ». 
Appendix D: Formative Assessments
STUDENTS' PERCEPTIONS OF FORMATIVE ASSESSMENTS USING GOOGLE FORMS

Quiz 5 Module 4

1. Nom al'pilien (exemple: chocolat, amande...)

2. Nombre secret

La loi générale des gaz

Nommer les gaz et les bases suivantes:

3. Température ambiant normale (TAPN) –
   - 273 K
   - 298 K
   - 373 K

4. Calcul le volume que le gaz suivant aura à TPN: 32 L, 1400 g, à 30 °C et 175 mmHg. (Rappelle l’équation PV = RT, le volume est _______.)

5. Un ballon d’anniversaire contient 1,8 litres d’air à TPN. Quel est son volume à température ambiante si la pression normale (TAPN) était de 1,013 bar? (Énoncé pris en Ex. 10. La valeur est _______.)

6. Animation: Félix est un astre. Il est un astre rouge. Il est un astre d'une taille de 10 km. La température du cœur d'un astre de 10 km est de 10 000 °C. Quel est le volume des ballons de 1,8 litres attachés à l'avant de la navette? (Énoncé aux conditions: Ex. 10.4) Non-homogène volume _______.

Preceded by

Press the link to view the Google Form.