Chief Reader Report on Student Responses:

2020 AP® Research Free-Response Questions

- Number of Students Scored 20,055
- Number of Readers 449
- Score Distribution

Exam Score	N	%At
5	1,770	8.8
4	6,439	32.1
3	6,324	31.5
2	5,012	25.0
1	510	2.5

- Global Mean 3.20

The following comments on the 2020 free-response questions for AP® Research were written by the Chief Reader Gregory Taylor of Purchase College, SUNY. They give an overview of each free-response question and of how students performed on the question, including typical student errors. General comments regarding the skills and content that students frequently have the most problems with are included. Some suggestions for improving student preparation in these areas are also provided. Teachers are encouraged to attend a College Board workshop to learn strategies for improving student performance in specific areas.

Performance Task: Academic Paper **Topic:** Varies by student

Max. Points: 10 **Mean Score:** 6.22

What were students expected to demonstrate in this performance assessment task?

This performance task was intended to assess students' ability to conduct scholarly and responsible research and articulate an evidence-based argument that clearly communicates the conclusion, solution, or answer to their stated research question. More specifically, this performance task was intended to assess students' ability to:

- Generate a focused research question that is situated within or connected to a larger scholarly context or community;
- Explore relationships between and among multiple works representing multiple perspectives within the scholarly literature related to the topic of inquiry;
- Articulate what approach, method, or process they have chosen to use to address their research question, why they have chosen that approach to answering their question, and how they employed it;
- Develop and present their own argument, conclusion, or new understanding while acknowledging its limitations and discussing implications;
- Support their conclusion through the compilation, use, and synthesis of relevant and significant evidence generated by their research;
- Use organizational and design elements to effectively convey the paper's message;
- Consistently and accurately cite, attribute, and integrate the knowledge and work of others, while distinguishing between the student's voice and that of others;
- Generate a paper in which word choice and syntax enhance communication by adhering to established conventions of grammar, usage, and mechanics.

How well did students address the course content related to this performance assessment task? How well did students perform on the skills required on this performance assessment task?

NOTE: The holistic rubric focuses on the following course proficiencies. The bulleted list below illustrates how students demonstrated strengths with these proficiencies.

- Overall, most students showed familiarity with the basic expectations of the academic paper. Extensive student effort was evident in most papers. Students continued to demonstrate consistency in application of the course's skills vis-à-vis past Readings, regardless of discipline.
- In *Understanding and Analyzing Context*, most students developed creative, interesting, and/or timely research questions with appropriate degrees of focus and situated their topics of inquiry in relation to previous scholarly findings and arguments. Most students clearly stated a research question or objective. Many students developed well-reasoned questions that were clearly linked to a broader context or relevance to a community of practice. Many students effectively argued why their question required additional research or examination. Some students organized their literature reviews in a such a way as to clearly clarify the gap to be filled by the student's research.
- In *Understanding and Analyzing Arguments*, most students effectively reviewed scholarly literature relevant to their inquiry. Most students were able to critically analyze scholarly work, and most were able to summarize

multiple perspectives within the relevant scholarly literature on their research question or topic of inquiry. Some students developed sophisticated literature reviews in which they placed sources in conversation with each other. Some were also able to situate their research in the field of practice placing them in conversation with each other.

- In *Evaluating Sources and Evidence*, students mostly drew upon credible and relevant sources in situating their question within a larger context and in developing their arguments while demonstrating an understanding of and fluency with scholarly sources.

- In *Research Design*, most students demonstrated an understanding of the need for a systematic method or approach to their question in order to generate data to analyze. Most students were able to choose a research method reasonably aligned with the student's specific research question, and most students were also able to correctly and systematically follow the steps of the chosen method. Most students were able to describe reasonably replicable procedures followed in the chosen method or approach and some were able to explain why (or how) that method and its reasonably replicable procedures would address the student's research question. Most students indicated an understanding of different types of data (e.g., quantitative and qualitative) generated by different research methods. Most students were able to recognize and acknowledge the inherent limitations of a chosen method. Some students showed an understanding of ethical considerations, sample selection, and procedure for collecting data. Some students linked the approaches used in the literature they reviewed to their own study, or adapted approaches used in the literature to their own research while some were good at describing limitations of the method or approach chosen.

- In *Establishing* (Their Own) *Argument*, most students stated a clear argument or claim and some recognized and acknowledged limitations on their ability to extrapolate conclusions from their evidence. Most were able to recognize and acknowledge limitations in their own use of a chosen research method, and some were able to recognize and acknowledge the limitations of their conclusions. Some were able to synthesize the results of the research to elaborate on a new understanding, and some were able to discuss the practical implications of the research findings. Some students discussed how the research findings expand upon or relate to what is already known in the discipline.

- In *Selecting and Using Evidence*, most students provided evidence relevant to the topic of inquiry, and most were able to present evidence in a format that is typical of the discipline of inquiry. Most students clearly described how their research findings relate back to the research question, and most included tables, figures, or charts that effectively displayed key findings. Many students were able to support their conclusions using relevant and sufficient evidence from their own research. Some students were able to conduct appropriate statistical analyses, and some were able to describe statistical analyses correctly.

- In *Engaging the Audience*, most students organized their papers in a manner that made it easy for the reader to follow the argument, the method/approach, and the examination of the evidence, and most clearly organized the paper sections, headings, and visuals. Most wrote in a style that was easily accessible to an educated, non-expert reader. Most were able to use organizational and/or design elements such as tables, figures, and charts effectively, and most students demonstrated the ability to organize their information to convey meaning (a skill initially developed in AP Seminar and built upon in AP Research). Most students wrote in a manner that clearly communicated the student's ideas, and many wrote in a manner that enhanced reader engagement.

- In Applying Conventions, most students followed the conventions of a standard research paper in their respective disciplines, and most adhered to established conventions of grammar usage and mechanics. Most consistently cited sources to support their arguments, many using appropriate citation style. Many students attended to ethical concerns relevant to the topic of inquiry or method of data collection.

What common student misconceptions or gaps in knowledge were seen on this question?

- Overall, student research has improved significantly over the past several years, especially in quality of writing, organization, and alignment. Rather than struggling to achieve "bare bones" research, a majority of academic papers continue to struggle to capture the nuances of elevated research reporting—rationale,

justification, analysis of student-generated data within the scholarly community, recognition and analysis of the limitations of a specific application of a research method, and the implications and limitations of student data within the context of a specific field and/or focus.

- In *Understanding and Analyzing Context*, some students developed overly broad or exploratory topics that lacked a pointed research question or a clear focus. Some students identified a narrowly focused question but did not continue this narrowed focus throughout their papers. Some claims made in the introduction in order to situate the question in a context were overly broad and uncited or otherwise unsubstantiated. Many students asserted rather than demonstrated that a gap existed in our knowledge, and many seemed to misrepresent or misunderstand this gap and/or used hyperbolic language when describing it. Many students are able to conduct a solid literature review, but then have difficulty identifying an authentic gap in the literature and instead assert a gap which seems intended to justify the convenience of research conducted with a specific new (student) population in a specific new locale (e.g., the student's class). Some students used hyperbole in discussing the importance of their topic or the novelty and significance of their findings. Some students employed multiple questions, or changed their main question throughout the paper, making it difficult for them to focus their inquiry. A few presented a position on a topic rather than develop a research question that could be explored though the process or inquiry.

- In *Understanding and Analyzing Argument*, some students did not firmly establish their research within a scholarly community, and some included only a minimal literature review or moved from an initial presentation of a research question or topic of inquiry to a description of method, omitting the literature review entirely. Some provided background information about the topic of inquiry rather than a review of the scholarly literature while some discussed multiple works in their review of the literature but did not explicitly relate these works to one another or to their own argument or perspective. A few students discussed a single perspective within the literature on their respective research questions, even if it was via discussing multiple authors with a similar perspective. A few had difficulty discussing and/or incorporating perspectives different from their own.

- In *Evaluate Sources and Evidence*, some students relied heavily on sources that were less than relevant or credible given the context of their inquiry, and some needed to devote more attention to sifting through evidence, excluding evidence that is less relevant to the research question. Some students neglected to integrate and discuss peer-reviewed, scholarly sources. Some students seemed to have difficulty bringing relevant sources in conversation with one another and with their own work; many discussed sources independently (one paragraph per source) rather than as part of a larger integrated conversation.

- In *Research Design*, while most students identified which method or approach they were using and most chose methods that were reasonably replicable, many did not justify that choice by addressing why they chose this approach to answer their question. In some cases, a method did not align with the question they were trying to answer or the evidence they needed to collect in order to test their argument, and many students seemed to be employing surveys for convenience rather than choosing surveys as an aligned and reasonable methodological approach to address the research question or project goal.

  Many students did not seem to fully understand the nuances or proper application of specific research methods, and many had difficulty logically defending the alignment of method to the specific inquiry. Some students claimed to be using one method while actually using a different method; in particular, many students who described their approach as a meta-analysis, content analysis, a "systematic review," thematic analysis, trend analysis, or even historical analysis did not actually conduct original research, but rather engaged in an extended second literature review. Though most students seemed to understand the difference between qualitative and quantitative methods and data, some students who chose to analyze quantitative data used inappropriate methods to do so, provided incomplete statistical information, or interpreted the information incorrectly. Some students described how to do the statistical tests but failed to adequately describe the statistical results or relate them to their conclusions. Many who used surveys in their research did not convincingly connect their choice of questions to their inquiry, and some who conducted surveys did not include the actual survey in the paper (or

even in an appendix). Students were not always clear as to how and why they selected their sample; sometimes these samples were biased, inappropriate, or too small to draw meaningful inferences from.

A few students who worked with human subjects did not indicate that they had pursued institutional review board (or human subjects research board) authorization, nor did they have sections in their papers that addressed ethical issues and explained how risks to subjects either had been minimized or avoided. Some students conducting surveys or interviews asked questions that were ethically problematic.

- In *Establishing (Their Own) Argument*, a few papers were unclear on the distinction between the literature, the student's specific argument, the method used, and the evidence. Many students summarized their conclusions but did not put their research or evidence into a bigger context, and many continue having difficulty with the meta-cognitive task of tying their own research back to a conversation in the discipline. Many students provided only superficial discussion of limitations for both methodology and conclusion, and some students quickly summarized a list of practical hindrances or problems encountered and presented this as a discussion of limitations, thus confusing limitations of conclusions with limitation of circumstance. Some students claimed *that* more research should be conducted on a particular topic, without clearly explaining why, or to what end.

- In *Select and Use Evidence*, some students did not substantiate links between their own claims and the evidence they presented from their original research. Some students attempted to link their own claims to evidence from the literature but did not provide evidence from their original research. Many of the papers that utilized surveys collected data from a convenient sample audience or lacked enough responses to adequately develop an argument. Many students seem to misunderstand the proper use of statistics, and misapply concepts such as mean value, standard deviation, and t-test. Some students who claim to be conducting a correlation analysis actually did not do so, or did so incorrectly. Some students assumed the data would speak for itself or expected the reader to draw their own connections and conclusions, instead of explaining the meaning and significance of all presented data in relation to the research question or topic of inquiry, and clearly analyzing the data in a way that logically defended the new understanding.

- In *Engaging the Audience*, some students overly relied on the convenience of graphs and charts from Google Forms, presenting raw evidence at the expense of cogently summarizing data in the results/analysis section of the paper. Some students used hard to read, hard to interpret, oversimplified, or under-explained graphs or charts to present their findings, and some used graphs and tables that did not effectively convey the data for the intended audience. A few students had issues with the organization of the paper. This made it difficult for the reader to follow the thread of the argument or the layout of the project design. A few students submitted papers/PDFs that were incomplete, missing pages, or in some other way were not final.

- In *Applying Conventions*, many students inadequately analyzed the ethical implications of their human subjects research. Some did not label images, tables, graphs, or figures clearly or appropriately. A few used images/figures, but failed to describe or analyze them. Many students did not clearly, consistently, and accurately cite claims or information from their sources in the text, and some did so only in the literature review. A few students did not clearly differentiate between the voice of others and their own voice, and few students employed quotations or summaries of sources without integrating them into the paper in a cohesive way. Some students engaged in sloppy scholarship, though very few engaged in overt "cut and paste" plagiarism.

- In *Applying Conventions***,** some students did not proofread their papers carefully, and/or did not correct errors of grammar, style, or mechanics that interfered with communication. The frequently incorrect or sloppy in-text citation and bibliographic citations of students illustrated that some students may not understand the rules of citation, or fully appreciate their importance.

Based on your experience of student responses at the AP Reading, what advice would you offer to teachers to help them improve the performance of their students on the exam?

- *Overall:* Teachers have done a wonderful job in helping students move from wrestling with the basics of systematic research to conducting original research using an explicit method or approach. Students have a better understanding of how to take the skills learned in AP Seminar and apply them in a substantively different way in AP Research. Teachers can help students facilitate this important skill transfer by continuing to emphasize how the writing, argumentation, and research tasks in AP Research differ from those in AP Seminar, thus requiring different strategies.

- *Rubric:* Establish a relationship with the rubric prior to teaching the course every school year. Require students to establish this same type of relationship. If students can use the rubric to help guide their thinking about published work and/or peers' projects, it will help them in making sure that their own projects meet the rubric's expectations. Have students score sample papers, or peers' papers, using the rubric, so that they better understand the difference across scores, as well as the different components of each score.

- *Process:* Emphasize that research is a process, one that requires time, reflection, problem solving, and revision. Teach students that the research process is a social and community-based endeavor, where researchers are in conversation with other scholars, and they can learn from each other's comments, ideas, and findings.

- *PReP:* Encourage students to use the Process and Reflection Portfolio (PReP) to document and reflect upon the process, and to help stimulate their own creative thinking. Use the PReP to make that process visible, to prompt student reflection, and to enable you to provide both positive and constructive feedback.

- *Peers:* Encourage students to find peers to share ideas and drafts with. Utilize peer review early and often. This allows project development and writing to go through iterations, rather than be constructed in sections without revisiting them, as students add to their papers. It also provides students with an opportunity to identify alignment issues early in the process. Peer review gives students valuable experience as presenters and as consumers of others' scholarly work. It also emphasizes the idea that research is an iterative and recursive process.

- *Expert advisors:* Encourage students to find expert advisors with whom to discuss their projects, and to help students ensure they perform research appropriate to the field. Also encourage students to discuss their limitations/conclusions with an expert advisor. Readers noted that students who reported working with an expert advisor, particularly on methodology, performed better than students who did not.

- *Higher Education Institutions:* Reach out to nearby colleges or universities. This could help with understanding human subjects/IRB issues, building relationships and research connections, and gaining access for students to start seeking access to databases or research librarians early in the process. They might also be good sources for expert advisers, oral defense panelists, and even venues for viewing or presenting student research.

- *Topics:* Encourage creative topics of study outside of the social sciences, especially in the humanities, arts, engineering, and technology as the curriculum of AP Research is broad and comprehensive enough to accommodate work in multifarious disciplines. Remind students doing such projects that they need to be explicit about their method, approach, and process. Encourage students to read widely within their chosen area of interest before choosing their research question to narrow their topic more effectively and to more clearly identify whether and to what degree a gap in our understanding exists.

- *Research Questions:* Emphasize the importance of developing one explicit, precise, focused research question that is narrow enough to be studied within the scope of the project but broad enough to develop a new understanding. Doing so affects the rest of the research project, and thus is essential. Remind students that all elements of the research paper should relate to the research question and should speak back to their argument. Remind them to state their research question early and clearly to help the reader understand the direction and focus of the research project. Consider asking students to regularly update or reflect upon their research questions in their Process and Reflection Portfolios (PRePs).

- *Audience:* Remind students to write as if the audience for their papers is an intelligent, non-expert who does not know anything about this specific area. Remind students that as the author and researcher, it is their job to clearly convey what they did, why the approach they took is appropriate given the topic of inquiry, what they found, and what implications their conclusions have for our understanding of the question. It is not the reader's job to infer any of this from the paper; it's the student's job to be clear and explicit. Also remind students that there is no guarantee that their paper will be scored by an expert in that field, making it all the more important to write clearly and explicitly for an intelligent, non-expert audience.

- *Abstracts:* Remind students that abstracts are useful organizational tools, but that they will not be scored as part of the paper. Have students verify that anything that appears in the abstract (if they choose to write one) also appears in the appropriate place in the body of the paper. Encourage students who want to write abstracts to do so after their papers are complete, and to do so as a summary of the paper, so that no new information, not already in the body of the paper, shows up in the abstract.

- *Introduction:* Emphasize revising the paper's introduction near the end of the research process, to clearly identify the question that guides the project and to situate the question within a broader context. Remind students that introductions need to avoid broad generalizations and should also be informed by sources and evidence. Remind them that statements of fact or argument need to be cited, even in the introduction. Remind students that research yields new understanding incrementally, and credible researchers moderate their claims. This means that hyperbolic language regarding what they will do or what new understanding they have generated should be discouraged.

- *Scholarly Sources:* Review what constitutes scholarly sources to use knowledge from AP Seminar to help scaffold work in AP Research. Compare examples of scholarly and non-scholarly sources that address the same topic.

- *Literature Reviews & Establishing a "Gap":* Show students examples of literature reviews from published works or from previous years' student papers to help them understand how researchers review the literature in a way that suggests a debate or illustrates a gap in our understanding. Discuss the need to explicitly demonstrate that a gap in the literature exists, rather than just asserting it. Ensure that students understand that identifying a gap in the literature is not meant to justify a predetermined convenient research method, such as a survey of classmates.

- *Database Searches:* Help students consider database search strategies, as well as alternative database options. Spend time helping students conduct database searches and teach them that though they may not find articles that relate directly to their topic, they will find sources that relate closely. Consider encouraging them to access databases or to consult with research librarians at local institutions of higher education early in the process.

- *Research Design:* Remind students that they need to clearly explain which research design, method of analysis, or approach they have chosen, how the research will be carried out, and why it is the appropriate method to address the research question. Defending research choices—justifying the use of an approach and justifying the choices made within that approach—is critical, but also needs the most reinforcing. Remind students that they are completing the task as laid out in the Course and Exam Description (CED), which means that the discussion of their methodology needs to be explicit, even when it is generally understood within the field, or when scholars in that field typically don't clearly layout their approach choices. A reader who is an intelligent non-expert should be able to easily understand that description and rationale and be able to reasonably replicate the approach.

- *Different Methods:* Help students understand that specific methods have specific requirements. For example, methods such as meta-analysis, content analysis, thematic analysis, statistical analysis, trend analysis, grounded theory, qualitative compartive analysis, systematic review, correlational analysis, and historical analysis (or historiography) have particular guidelines and procedures that must be followed. Students are using these methods without clear explanation of what they have done, and without clear understanding of how to use these methods. Encourage students to read within their area to better understand appropriate methodology choices.

Provide examples where possible, and close-read these samples to check for method explanation and alignment. Allow for time to teach deeply about different research methods (including modeling, building together, and peer review).

- *Surveys:* Given how frequently students rely on survey methodology, teachers should devote significant class time to teaching effective survey construction and implementation in order to make sure students understand the purpose and applicability of survey research. Emphasis is needed particularly on question construction, effective sampling, and the need to justify all of the choices made along the way. Students should be encouraged to put all survey questions in the paper (or at least within an appendix). Note that if students survey adjacent populations (e.g., classmates), it should be for clearly defensible reasons, *vis-a-vis* the research project, and not simply for the sake of convenience. If surveying classmates or high school students does not represent a well-aligned method designed to answer the given research question fully, students should abandon this method for one that makes more sense. Finally, students need to defend their choice of a survey as their methodology, explaining why it is the appropriate choice given their question or argument.

- *Statistical Analyses:* Teachers should remind students that they need to apply the appropriate statistical test to their question, justify that choice, and explain it clearly to the reader. Encourage students to always explain the meaning of their statistical results and to elaborate what these mean for their argument. Students seem to focus more on describing how they performed a particular statistical test and what that test means rather than on describing and explaining the statistical result and its implications for their argument and conclusion.

- *Alignment:* Teachers should spend more time discussing the need for alignment throughout the study. For instance, some papers had methods that were not aligned with the question being asked, which led to evidence collected that could not speak to that question. This suggests that students may not be putting enough thought into justifying their choice of method as it relates to their research question. Alignment is an issue throughout the study, however, as occasionally conclusions drawn do not relate to the inquiry approach used, the literature evaluated, or even the question asked. Alignment should be checked regularly and should be considered at every step of the research process. Teachers should consider reviewing example papers with students, highlighting alignment or problems with alignment in those examples.

- *Unfamiliar Approaches:* If students are using a methodology with which the teacher is unfamiliar, the teacher can recommend that the student find an outside expert who can review and comment on that approach. Teachers might also invite other instructors or bring instructional materials into the classroom. For instance, teachers who do not feel comfortable with data might think about inviting an AP Statistics teacher to work with students or could assign statistics videos for students to watch and later apply to their papers. Finally, finding exemplars of the type of method in published work or in previous student papers would be helpful to students.

- *Peer Methods Communities:* Encourage students to engage in peer reviewing even while developing their methodologies. This might be made easier if students create "method communities" in the classroom, where students with similar research methods can give each other feedback on their approach while communicating ideas and conclusions.

- *Ethical Issues:* Teachers need to spend more time prior to the research proposal discussing ethical issues, and helping students think through the effects of their choices on their research subjects. There were a number of papers that collected sensitive information or asked clearly disturbing or triggering questions without evidence of an IRB or some way to gain consent. Message the need to address ethical issues proactively, fully, and appropriately, particularly when dealing with human or animal subjects. Remind students that it is their responsibility to act in an ethical manner while carrying out their study responsibly, and in presenting the data honestly and accurately. Even if students will not go through an IRB / human subjects review process, encourage them to reflect on ethical issues of their projects' methodology or implications, as it is expected that they do so.

- *Plagiarism:* Emphasize to students that it is their responsibility to act in an ethical manner with regard to appropriate citation and attribution. Use Turnitin.com to ensure that students are complying with AP Research course guidelines regarding plagiarism.

- *Start Early, Plan Ahead:* Consider creating a timeline for student success in the yearlong research process. Emphasize the importance of starting to collect the evidence or data as early as possible in the year, to leave enough time to carry out the study, complete the analysis, and leave time to write up and revise the paper. Students appear to be spending a great deal of time on their reviews of the literature and the development of their methodology, but not on analyzing the information that they collect or drawing conclusions from that information. These sections tend to appear more rushed and less complete than the earlier sections of the paper.

- *Analyzing Data:* Teachers should construct more activities on how to analyze data (for instance: how to use primary documents in historical analysis, or how to do content analysis, or descriptive statistics calculation).

- *Conclusions:* Teachers should encourage students to conclude with an analysis on how the paper's conclusion (drawn from evidence generated by the research method) contributes to the conversation. Summary is an important first step, but conclusions need to also contain reflection and analysis. In the conclusion, papers that referred back and compared the new findings to previous findings demonstrated an ability to show how their results had meaning beyond their own study. That also helped to show the new understanding and its relevance. New understandings discussed should be evidence-based (a result from their study's analysis, findings, or data), rather than simply a new awareness based on the reading they have done or the process that they have undergone. They should also be discussed and elaborated upon, rather than simply asserted.

- *Limitations:* Teachers should remind students that they should discuss the limitations of their study's design and conclusions, not on student circumstance or access to resources or time. Limitations should be tied to the conclusions in that they explain how certain the conclusions are, or to what degree they are generalizable, reliable, or valid.

- *Implications:* Encourage students to see the implications and conclusions sections of their papers as critical components that allow them to situate their study's findings and help the findings to have meaning beyond the study. The implication sections in weaker papers suggested that this step was an afterthought or an attempt to simply catalog possible sources of error, rather than an opportunity to address the "so what?" implications of their research or the opportunity to speak back to the professional discussion. Encourage students to reflect on and write about why their results are what they are; have them point out where their results matched previous research (and explain why this could have happened) and where it did not (and explain why this could have happened). Remind students to situate their findings in the literature.

- *Appendices:* If students wish to use an Appendix, remind them to discuss the most pertinent material or evidence in the body of the paper, and to explicitly reference (and direct the reader to) the Appendix in the main text of the paper.

- *Writing and Citation Style:* Make sure students know the writing style and citation style expected in their discipline. Spend time emphasizing proper and consistent citation techniques, including the need to cite works of art, images, tables, or figures throughout the entire body of the paper, and the need to fully cite all online sources (not just the URL/web address). Teach, model, discuss, and work with students throughout the year regarding the mechanics of citations. Remind them to proofread to avoid incomplete or error-filled "works cited" sections.

- *Proofreading:* Remind students that prior to their final submission they should proofread their work carefully. At this time, they should remove their names, school information, teacher and expert advisor names, and other identifying information from works to be submitted. Consider giving teachers the ability to redact that sensitive information before upload.

- *Uploading:* Sometimes conversions from Google Docs or other formats to PDF result in some content being lost. Remind students to make certain that the PDF they are about to submit is absolutely their final paper, contains all the desired text and elements, and is the version that they intend to be scored.

What resources would you recommend to teachers to better prepare their students for the content and skill(s) required on this question?

- Use the rubric as a teaching tool and a guide for the students throughout the course. Periodically have students review the rubric and ask (perhaps in the PReP—Process and Reflection Portfolio) whether the elements of their academic paper have met the criteria in the rubric.

- Use the Student Workbook and associated PowerPoint presentations from the AP Research Teacher Community (https://apcommunity.collegeboard.org/web/apresearch) to help students focus their research questions, align their chosen method to the purpose of their inquiry, and to ensure they are addressing ethical research practices in writing and in the implementation of their method.

- Teachers should attempt to troubleshoot their curricula on the AP Research Teacher Community, encouraging and engaging in dialogue that supports their own development of the course and course expectations, particularly after they receive their score report data.

- Teachers should also consider applying to be readers during the AP Research Reading, as this professional development not only allows teachers to understand the rubric, but it provides access to student work that creates more context for the course and the various disciplines of scholarly research.

- Citations in many student papers were disorganized, missing sources, or formatted incorrectly. Effective use of free plug-ins or apps such as Zotero (https://www.zotero.org/) can help students organize their cited sources and cite them consistently and in the correct format.

- Purdue Owl (http://owl.english.purdue.edu/owl) is a great, free online source on citation and reference formatting. It contains information on many widely used citation styles and guidelines regarding best practices in source citation and attribution.

- Human Subjects / IRB training would be useful professional development for AP Research teachers but would also benefit AP Research students who will be engaging with people for their projects. While there is an IRB education exemption for most high school students' projects (based on U.S. Department of Health and Human Services guidelines), such training would help students to at least talk about the ethical issues involved in their study, which is still required. It also models better research practice, which would be required at the college or university level. One free option is the online Protecting Human Research Participants module, from the National Institutes of Health's (NIH) Office of Extramural Research, at https://phrp.nihtraining.com.

- Teachers should look into alternative journal collections such as JSTOR, search engines such as Google Scholar, or consider a field trip to the local university library to use those resources. This way, students have a wealth of information outside of EBSCO. Teachers might consider building partnerships with local colleges or universities and their libraries to provide more resources to students, and to introduce local institutions of higher education to the great work AP Research students are doing.

- Encourage students interested in historical research to look into digital archives and data sets. There is a wealth of letters, diaries, and artifacts from under-represented groups that have been digitized and made widely available. Students looking for an innovative topic should look to the work of digital historians and digital history projects to find data that has only been lightly explored.

- There are various quantitative database websites with online analysis built in to the platform (especially in the social sciences), such as Gapminder, Google Trends, Kaggle, the European Social Survey, GESIS, World Values

Survey, or the General Social Survey. There are also numerous sources for aggregate public opinion data, such as the Pew Research Center, Roper iPoll, Gallup, and PollingReport.com. Free open source government and international organization data also exist at websites such as http://www.data.gov, http://www.census.gov, https://data.worldbank.org, http://data.un.org.

- Students who want to conduct statistical analyses can use a free online tool called PSPP, which can be accessed at http://www.gnu.org/software/pspp. It is designed to be similar to SPSS, a commonly-used statistics software package, and is generally user-friendly.

- Professors at nearby colleges or universities could become resources: as expert advisors, oral defense panelists, or as guest lecturers who might, for instance, come and talk about good qualitative methodology or about ethical issues in working with human subjects.

- If your local college or university holds an honors day or research symposium event where undergraduate students are presenting their research, consider finding out whether your class can attend (or even present their work). They could see different kinds of research and, hopefully, observe good presentations. For students who perhaps were not thinking about going to college, seeing where their research could take them could be meaningful and encouraging.