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AAO Foundation Final Report Form
(a/o 6/30/2019)

Please prepare a report that addresses the following:

<u>Type of Award</u> Orthodontic Faculty Development Fellowship Award

<u>Name(s) of Principal Investigator(s)</u>   Sohyon "Michelle" Kim, DMD, MS

University: Oregon Health & Science University

<u>Title of Project</u>   Blended learning model for cephalometrics amid and after the COVID-19 pandemic

<u>Period of AAOF Support</u> (e.g. 07-01-20 to 06-30-21): 07-01-21 to 06-30-22

<u>Amount of Funding</u> $15,031.75

<u>Summary/Abstract</u>

Objective: This pilot study determined if there were significant differences in effectiveness and student satisfaction when learning cephalometrics with traditional instruction model versus blended learning model.
 Specific Aims: 1) To determine if there is a significant difference in student performance in cephalometric education when delivered via a blended learning model versus traditional instruction model, 2) To assess student satisfaction of the learning experience in cephalometrics with a blended learning model, 3) To survey students regarding the changes caused by the COVID-19 pandemic and how these affected their stress levels, their dental education, and their future careers.
Materials and Methods: Approval for the study protocol was obtained from the Oregon Health Science University Institutional Review Board. Study group was second year dental students (Class

of 2024, n=35) who took ORD 727 Orthodontic Techniques course in spring 2022 using a blended learning model. The control data for Specific Aim 1 were grades from the ORD 727 class from the spring term of 2019 (Class of 2019, =70) who took the ORD 727 course using a traditional instruction model. For Specific Aim 2, control data was the pre-class survey and the study data was the post-class survey. Longitudinal data will be collected and analyzed for Specific Aim 3. The class of 2024 will be sent the COVID-19 related survey again after 6 months of the conclusion of the spring 2022 term.

Table 1. Data Collected and Instruments

Data from Students	Instrument
Demographics and Anticipated satisfaction level of upcoming blended learning model	Pre-class survey
Performance	In-class activity grades
Satisfaction with blended learning model	Post-class survey
Demographics, Stress level due to pandemic-related changes, Opinion of pandemic's effect (dental education, future career)	Post-class survey

Descriptive statistics including mean ± standard deviation (SD) were computed for student performance of in-class activity and to analyze the pre- and post-class survey answers. Numerical values were assigned to each response for this analysis (1=strongly disagree to 5=strongly agree). To address Specific Aim 1, student performance between groups was examined using independent samples t-test. For Specific Aim 2, independent samples t-test was used to compare pre-class survey results to post-class survey results of the same question. For Specific Aim 3, independent samples t-test will be used to compare COVID-19 related survey results from spring 2022 to COVID-19 related survey results from fall 2022. Statistical analysis employed software (SPSS version 25; IBM, Armonk, NY) with significant set at $p < 0.05$.

Results: Thirty five students from class of 2024 consented to participate in the study. The range for student age was between 20 years of age and 35 years of age. 66% of the students reported their age to be between 20 and 25 years of age followed by 31% who reported their age being between 26 and 30 years of age. There was only one student whose age was over 30 years. 57% of the participants were females and 43% of them were males. Student performance data of two groups were similar. Mean scores for study group were 41.1 ± 0.9 and those for control group were 41.0 ± 1.6 (Total available score=42). The difference between the two was not statistically different (p=0.659) .

Table 2. Mean student performance after two types of instruction

|	Traditional instruction model	Blended learning model	p-value
Mean student performance	41.0 ± 1.6	41.1 ± 0.9	p=0.659

Study group was asked evaluate their level of agreement with the following statement during pre- and post-class surveys: I think blended learning model has the potential to be effective. Numerical values were assigned to each response for statistical analysis (1=strongly disagree to 5=strongly agree). Overall, students feel that blended learning model has the potential to be effective. Students' level of agreement with this statement decreased after their experience with the blended learning model. However, this change was not statistically significant (p=0.178).

Table 3. Mean student evaluations on perceived effectiveness of blended learning model

|	Pre-class survey	Post-class survey	p-value
Mean student evaluation	4.5 ± 0.7	4.2 ± 1.7	p=0.178

Evaluation for perceived effectiveness of blended learning model was on scale from 1=strongly disagree with the statement to 5=strongly agree with the statement.

Students also feel that having pre-recorded lecture video available during the class and in-class discussions enhanced their learning experience.

Figure 1. Additional Post-Class Survey Questions
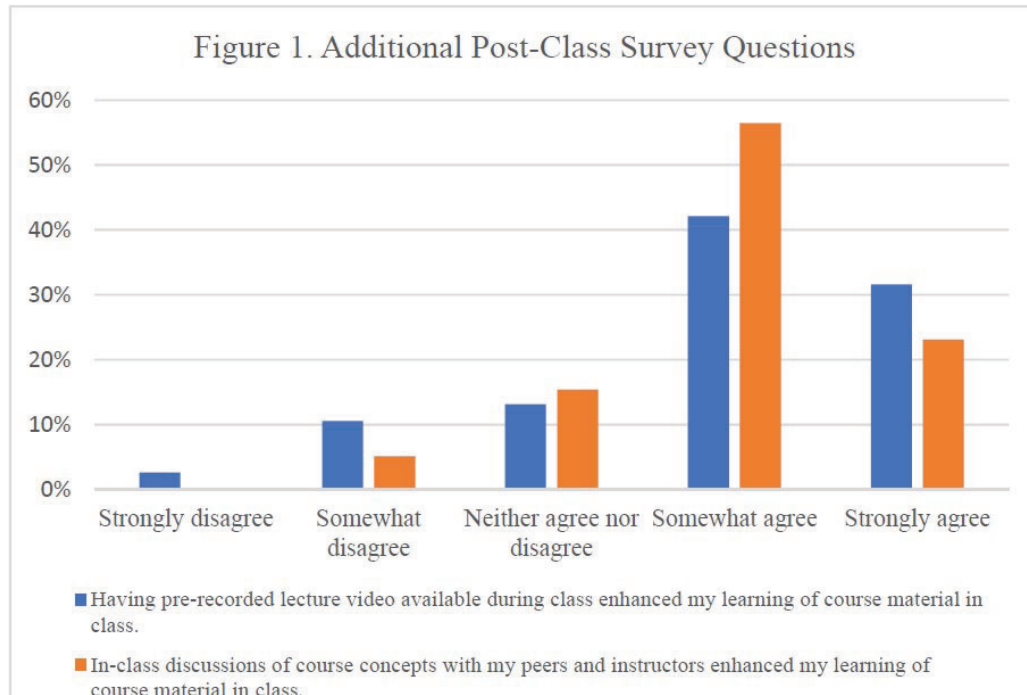
On the survey regarding the changes caused by the COVID-19 pandemic and how these affected students' stress and their perception on their future careers, students reported that the pandemic has impacted their dental education negatively. The majority of them also reported that they have felt burned out from their school work since the pandemic has started. Approximately 40% of the students answered that they are worried about possible difficulty finding jobs after their graduation due to COVID-19.

Figure 2. COVID-19 Survey
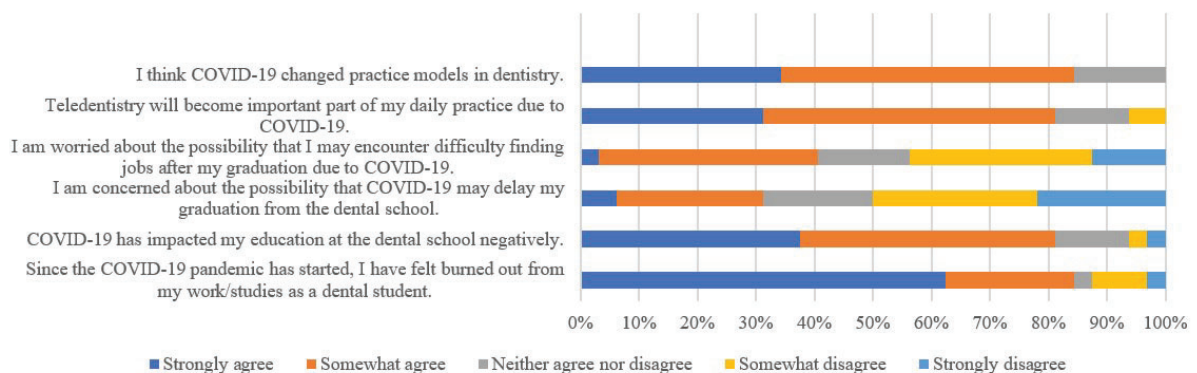
Conclusions: 1) There is no significant difference in student performance in cephalometric education when delivered via a blended learning model versus traditional instruction model, 2) Overall, students think that blended learning model has the potential to be effective in learning cephalometrics, and 3) Students feel that the COVID-19 pandemic has had negative impact on their dental education, their well-being, and their future outlook for their career after the graduation. Longitudinal survey data for the Specific Aim 3 will be collected in the future and will be added to the future data analysis.

Respond to the following questions:

1. Were the original, specific aims of the proposal realized?
   Specific Aims:: 1) To determine if there is a significant difference in student performance in cephalometric education when delivered via a blended learning model versus traditional instruction model: This was not realized. However, this was a pilot study and the specific aim 2 shed the light on that students have positive perception toward the blended learning model. More longitudinal data on this aim may be able to realize it.
   2) To assess student satisfaction of the learning experience in cephalometrics with a blended learning model: This was realized. Students feel that the blended learning model has the potential to be effective for learning cephalometrics.
   3) To survey students regarding the changes caused by the COVID-19 pandemic and howw these affected their stress levels, their dental education, and their future careers: Students feel that the COVID-19 pandemic has had negative impact on their dental education, their well-being, and their future outlook for their career after the graduation.

2. Were the results published?
   The results have not been published, but I have been working on a manuscript to have the results published in the Journal of Dental Education. AAOF support will be acknowledged and co-authors will be Jeffrey Jones, M.E.T, Th.M., M.Div. and Laura Iwasaki, D.D.S., M.Sc.,Ph.D. Once the longitudinal data for the Specific Aim 3 are collected, we will prepare for another publication.

3. Have the results of this proposal been presented?
   The results have not been presented, but I am aiming to have the results presented at the 2023 OHSU School of Dentistry Annual Research Day. By that time, we will be able to include the first long-term data for the Specific Aim 3 in the presentation. AAOF support will be acknowledged and co-authors will be Jeffrey Jones, M.E.T, Th.M., M.Div. and Laura Iwasaki, D.D.S., M.Sc.,Ph.D.

4. To what extent have you used, or how do you intend to use, AAOF funding to further your career?
   This is my second time receiving AAOF funding. AAOF funding has been tremendous help in my development as an academic orthodontist. I have used the funding to attend numbers of very informative training courses that helped me improve my teaching, research, and clinical skills. As the next step, I would like to apply for the BRA in coming years to further my career. I would like to take advantage of my business background and apply for the Business Practice of Orthodontics category of the BRA funding.

Accounting for Project i.e., any leftover funds, etc.
Please see Appendix for the budget table. Leftover funds were calculated to be $1971.50.

Appendix

Category	Original Budget Amount		Used Budget Amount		Difference = Original Budget Amount - Used Budget Amount
Salary/Supplement					
OHSU Salary (Calculated at 3% overall effort)		$3,756.00		$3,756.00	$0.00
	Total	$3,756.00	Total	$3,756.00	$0.00
Research Plan					
Data collection, data analysis, and manuscript publication		$0.00		$0.00	$0.00
	Total	$0.00	Total	$0.00	$0.00
Educational Plan					
OHSU Educational Scholars	Tuition	$2,500.00	Tuition	$2,500.00	$0.00
Virtual Teacher Specialization Certificate course, University of California, Irvine	Tuition ($39/month * 6 months)	$234.00	None	$0.00	$234.00
	Total	$2,734.00	Total	$2,500.00	$234.00
Teaching Skills Plan					
ADEA eLearn bimonthly webinars	Tuition	$0.00	Tuition	$0.00	$0.00
UPenn+AAL Fundamentals of Clinical Education	Tuition	$395.00	Tuition	$395.00	$0.00
2022 American Dental Education Association Annual Session & Exhibition	Registration and travel	$2,000.00	None	$0.00	$2,000.00
	Total	$2,395		$395.00	$2,000.00
Clinical Skills Plan					
UPenn Professional Development in Health Care Innovation	Tuition ($1,000/course * 4 courses)	$4,000.00	Tuition ($1,000/course * 4 courses)	$4,000.00	$0.00

Spanish with Mercedes Online course	Tuition	$115.00	Tuition ($50/hour * 5 hours)	$250.00	-$135.00
University of Birmingham Improving your image: Dental Photography in practice course	Tuition	$74.00	None	$0.00	$74.00
Exceptional Clinical Photography Made Easy - Part 1 by OrthoPreneurs	Tuition	$0.00	Tuition	$195.00	-$195.00
AAO Continuing Education Passport	Fee	$120.00	Fee	$120.00	$0.00
	Total	$4,309	Total	$4,565	-$256.00
Other					
AAO annual dues for junior faculty		$508.25		$508.25	0.00
ADA annual dues		$667.00		$676.00	-9.00
WA dental license renewal fee		$402.50		$400.00	2.50
ABO annual dues		$260.00		$260.00	0.00
	Total	$1,837.75	Total	$1,844.25	-6.50
Grand Total					
	Grand Total	$15,031.75	Grand Total	$13,060.25	$1,971.50

List of abbreviations: OHSU = Oregon Health & Science University; N/A= not applicable; SOD = School of Dentistry; CE = Continuing Education; ADEA = American Dental Education Association; AAO = American Association of Orthodontists; ADA = American Dental Association; AAL = Academy for Advancing Leadership; UPenn = University of Pennsylvania; TBD = To be determined; WA = Washington State; ABO = American Board of Orthodontics