SOPRANO CLARINET, BASS CLARINET, AND ALTO SAXOPHONE:

A PRELIMINARY STUDY IN COMPARATIVE PEDAGOGY

by

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Review of Literature

Many woodwind instrumentalists in the United States learn to play their instruments by using a method book designed for heterogeneous instruction by a band director who does not necessarily perform at a high level on the instruments he or she teaches (O'Reilly & Williams 1997; Lautzenheiser, Higgins, Menghini, Lavender, Rhodes & Bierschenk 2004; Pearson & Nowlin 2016; Pearson 2017). Although the clarinet edition of each of the four most widely used method books contains foundational elements—instrument assembly and care; playing position, including posture and hand position; embouchure; articulation; fingerings; and sections of technical development specific to the clarinet—the author-educators construct the books foremost for the benefit of the beginning band teacher responsible for large classes of heterogeneous instrumentation instead of homogeneous instruction focused on individual development for a specific instrument. Notably in this regard, all four books employ "too" as the syllable for articulation; even accepting "t—" as the consonant of articulation, "—oo" sets an unusual voicing for the clarinet, more useful in embouchure formation than sound production.

For non-clarinetists, non-bass clarinetists, and non-saxophonists, the first experience with these instruments likely happens in a university woodwinds methods course. A commonly used woodwinds method textbook in the collegiate setting is Frederick W. Westphal's *Guide to Teaching Woodwinds* (Wagoner & Juchniewicz, 2017). Westphal includes comprehensive chapters on each woodwind instrument—flute, clarinet (including bass clarinet among other instruments in the clarinet family), saxophone, oboe, and bassoon—as well as separate chapters on clarinet and saxophone mouthpieces and reeds, oboe and bassoon reeds, and vibrato. Chapters on clarinet and saxophone both include overviews of the instrumental family, playing

ranges, student qualifications, assembly, holding and hand position, embouchure, tuning and intonation, tone, articulation, selection and care of the instrument, and suggested study materials and solo literature. As the bass clarinet receives treatment within the clarinet chapter, the coverage proves more limited. The saxophone chapter includes a section on doubling, within which a total of three short paragraphs address differences between clarinet and saxophone, and the chapter on vibrato includes some explicit comparison, but the chapter on single-reed mouthpieces draws no distinction between instruments (Westphal 1990). Preservice teachers often receive instruction in pedagogy and performance on the instrument from their instructor(s) in the classroom setting, and the Westphal text (or others like it) serves a supplementary source of information. The text, however, represents accepted views regarding pedagogy that are embraced in the instrument methods curriculum.

Band directors often receive further pedagogical instruction not from specialists on a given instrument but from other band directors concerned with the whole of the classroom of students playing a variety of instruments (Cavitt 2012). While Cavitt's *On Teaching Band: Notes from Eddie Green* includes instrument-specific instruction, each chapter, and subchapter, fits into a framework of focusing first on what elements are (or what a non-specialist perceives to be) most universal before working down toward specifics. While this could be characterized as a comparative approach, this approach represents a philosophy of helping teachers understand the similarities between instruments rather than focusing on differences. Additionally, the only available study comparing the pedagogy of articulation across woodwind instruments intentionally homogenizes the approach, drawing no distinction between disparate physical procedures of articulation between instruments (Sullivan 2006).

Many soprano clarinet, bass clarinet, and alto saxophone artist-teachers have written pedagogical or technical resources for their instruments (Bonade 1957; Stein 1958; Teal 1963; Russianoff 1982; Bok 1989). Stein in *The Art of Clarinet Playing* and Teal in *The Art of Saxophone Playing* take the most comprehensive approaches. Bonade's 17-page *Clarinetist's Compendium* presents information on a wide array of important topics but in such a concise manner that some advanced facility would be required to apply it. Bok's *New Techniques for the Bass Clarinet* also requires a high degree of accomplishment since it focuses exclusively on extended techniques. Any consideration of the differences between these instruments, however, has been limited and focused on performers desiring to play multiple instruments rather than enunciating the differences in approach to the instrument among specialists of different instruments (Teal 1963). No one has yet undertaken a comprehensive research study on comparative pedagogy of single-reed instruments.

Need for the study.

Although many woodwind pedagogy resources exist, there are no prior studies that attempt to develop best-practices models through comparison of the teaching practices of artist-teachers or comparisons of pedagogy between instruments. Most pedagogical resources represent the anecdotal expertise of one artist-teacher rather than comparisons between multiple artist-teachers of the same instrument. The purpose of this study is to produce best-practices pedagogical approaches for soprano clarinet, bass clarinet, and saxophone, and distinction of differences between the instruments for teachers of multiple woodwind instruments. This is a descriptive study, relying on qualitative analysis of survey data solicited from artist-teachers.

Method

Participants

Participants for this study were artist-teachers employed at the level of professor, associate professor, or assistant professor with the responsibility of teaching applied clarinet or applied saxophone at universities within the United States that offer graduate degrees in music. I identified these individuals through advanced searches in the Directory of Music Faculties of the College Music Society (http://lib.music.org/) through applying search filters of faculty rank (Prof; Assoc Prof; Asst Prof), teaching specialization (Woodwinds: Clarinet; Woodwinds: Saxophone), location (State), and institution type (Graduate Degree).

Procedure

Participants received an email invitation to respond to the survey through *Qualtrics: Online Survey Software & Insight Platform®*, which included the consent document and media release in addition to the survey questions. The survey included questions regarding the physical approach to the instrument in the areas of embouchure, air support, and voicing, in addition to each respondent's primary instrument. Each question specified to which instrument the answer should apply, and respondents only answered questions for the instruments for which they teach applied lessons. The first survey invitation email was sent through *Qualtrics*'s automated system on November 27, 2018, with reminder emails sent on December 1, 8, and 11, 2018. Recorded responses arrived between November 27, 2018 and January 3, 2019. Of 464 invited participants, 65 responded, producing a 14% response rate. The complete survey appears in Appendix A.

Analysis

I analyzed recorded response data through the *Qualtrics*® system and exported into Microsoft Excel for data collection and comparison. For qualitative information, I used coding procedures to facilitate comparison. Through this process, I made comparisons regarding pedagogical similarities and differences across the instruments with the goal of defining best practices for pedagogy and instruction.

Results

Participants ranked air support, embouchure, and voicing in order of importance for tone production, assigning each choice a value of one, two, or three, separately for each instrument they teach (soprano clarinet, bass clarinet, and/or alto saxophone). A lower value for the mean ranking indicates higher importance. The mean results show air support as the most important factor for all three instruments—bass clarinet (M = 1.41), alto saxophone (M = 1.50), and soprano clarinet (M = 1.62). Results indicate embouchure as the second-most important factor for alto saxophone (M = 1.79) and soprano clarinet (M = 1.90) and the least important of these three factors for bass clarinet (M = 2.36). Voicing emerged as the lowest-ranked factor for alto saxophone (M = 2.71) and soprano clarinet (M = 2.49) but the second-most important factor for bass clarinet (M = 2.23). Despite the narrow spread of possible responses (between one and three), the standard deviations of all responses indicate the greatest consensus on ranking voicing the least important factor for soprano clarinet and alto saxophone.

Table 1
Rankings of embouchure, voicing, and air support in importance for tone production

	Soprano clarinet (n = 39)		Bass clarinet (n = 22)		Alto saxophone (n = 34)	
	Mean	SD	Mean	SD	Mean	SD
Air Support	1.62	0.78	1.41	0.67	1.50	0.71
Embouchure	1.90	0.79	2.36	0.79	1.79	0.69
Voicing	2.49	0.64	2.23	0.69	2.71	0.52

Air Support

Air support.

The survey asked participants if *air support* during output should be constant or variable while playing the soprano clarinet, bass clarinet, and alto saxophone, respectively. For all three instruments, the majority of artist-teachers indicated that air support should be constant, with 77% of clarinet instructors, 82% of bass clarinet instructors, and 91% of saxophone instructors in agreement. Participants who responded that air support during output should be variable were then asked in free response format which factors would cause air support to change while playing each respective instrument. The question, "Which factors cause air support to change while playing the soprano clarinet?" or "…the bass clarinet?" or "…the alto saxophone?" indicated no restrictions for the free response answers. I then coded the responses into categories including 1) dynamic level, 2) register, 3) the resistance of each note, 4) variation of tone color (including any mention of quality of sound, changes in tone, or color), 5) musical context (including mentions of nuance, taper, references to phrasing, and the phrase, "dependent on the piece"), 6) voicing, and 7) extended techniques. For this and all free response question results in this study, all components of a response were coded separately. Thus, percentage columns may not equal 100% because responses frequently mention multiple codes. Instead, percentage columns report the percentage of participants who mentioned each code in their responses. The most cited factor was changes in dynamic level, with 100% of applicable respondents for bass clarinet, 56% of applicable respondents for soprano clarinet, and 33% of applicable respondents for alto saxophone mentioning dynamics as a determinant for changes in air support. See Table 2 below for the complete list of factors listed as causing change in air support for all three instruments. See Appendix B for tables breaking down overall responses by participants'

primary instruments. As column headings throughout this document, CL refers to soprano clarinet, BCL refers to bass clarinet, and SX refers to alto saxophone. "Overall CL," to explain all such headings with one example, includes answers from all participants who teach applied lessons on soprano clarinet, regardless of the participant's primary instrument.

Table 2

Summary of air support variability factors

	Overall CL	% Overall CL	Overall BCL	% Overall BCL	Overall SX	% Overall SX
Air support during output:	(n = 39)		(n = 22)		(n = *34*)	
Constant	30	77%	18	82%	31	91%
Variable	9	23%	4	18%	3	9%
Factors affecting variability:	(n = 9)		(n = 4)		(n = 3)	
dynamic level	5	56%	4	100%	1	33%
register	2	22%	0	-	0	-
resistance of each note	2	22%	0	-	0	-
variation of tone color	2	22%	0	-	0	-
musical context	0	-	1	25%	1	33%
voicing	0	-	1	25%	0	-
extended techniques	0	-	0	-	1	33%

Note. Some participants indicated multiple responses.

Air velocity.

The survey then asked participants if *air velocity* during output while playing soprano clarinet, bass clarinet, or alto saxophone should be constant or variable. A majority of participants for each instrument—79% of alto saxophone instructors, 67% of soprano clarinet instructors, and 59% of bass clarinet instructors—indicated that air velocity should be variable.

Participants indicating air velocity as variable answered a free response question inquiring which factors cause air velocity to change. The question, "Which factors cause air velocity to change while playing the soprano clarinet?" or "…the bass clarinet?" or "…the alto saxophone?" again indicated no restrictions for the free response answers. I coded responses into categories represented as 1) dynamic level, 2) musical context, 3) register, 4) variation of tone color, 5) concerns of sound production ("blowing harder or softer," "the support of the abdominal wall muscles and intercostal muscles," and any reference to the physical mechanics of varying the air velocity), 6) resistance of each note, 7) intonation, 8) individual air capacity, 9) inseparable from air volume (representing any explicit mention of inability to distinguish between air velocity or air volume, as well as the belief that neither velocity nor volume may change independently), 10) extended techniques, and 11) voicing. Dynamic level again was the most common response, cited by 63% of saxophone instructors, 46% of bass clarinet instructors, and 42% of clarinet instructors. Musical context represented the second-most common response, and comments included phrasing, style, nuance, and accented articulations, mentioned by 38% of bass clarinet instructors, 30% of saxophone instructors, and 23% of clarinet instructors. Changes in air velocity due to register received mentions from 38% of bass clarinet instructors, 30% of alto saxophone instructors, and 19% of clarinet instructors. Further, 23% of bass clarinet instructors, 12% of clarinet instructors, and 11% of saxophone instructors indicated desired variations in tone color as a factor creating change in air velocity. For a complete list of factors for variability in air velocity for soprano clarinet, bass clarinet, and alto saxophone, see Table 3. For complete responses organized by instrument and separated by participants' primary instrument, see Appendix B.

Table 3

Summary of air velocity variability factors

	Overall CL	% Overall CL	Overall BCL	% Overall BCL	Overall SX	% Overall SX
Velocity of air output:	(*n* = 39)		(*n* = 22)		(*n* = 34)	
Constant	13	33%	9	41%	7	21%
Variable	26	67%	13	59%	27	79%
Factors causing variation:	(*n* = 26)		(*n* = 13)		(*n* = 27)	
dynamic level	11	42%	6	46%	17	63%
musical context	6	23%	5	38%	8	30%
register	5	19%	5	38%	8	30%
variation of tone color	3	12%	3	23%	3	11%
concerns of sound production	3	12%	1	8%	0	-
resistance of each note	2	8%	1	8%	0	-
intonation	1	4%	1	8%	0	-
individual air capacity	1	4%	0	-	0	-
inseparable from volume	1	4%	0	-	0	-
extended techniques	0	-	0	-	2	7%
voicing	0	-	0	-	2	7%

Note. Some participants indicated multiple responses.

Air volume.

The final survey question regarding air support asked participants if *air volume* should be constant or variable while playing soprano clarinet, bass clarinet, and alto saxophone, respectively. Participants who answered that air volume should be variable again received a free response question to indicate factors that encouraged that change, and I again coded responses as represented as 1) dynamic level, 2) inseparable from air velocity, 3) register, 4) variation of tone color, 5) musical context, 6) individual air capacity, 7) concerns of sound production, 8) resistance of each note, 9) intonation, 10) variable but unspecified (from a response indicating

“unsure how to answer”), 11) voicing, 12) extended techniques, and 13) vibrato. Eighty-five percent (85%) of clarinet instructors, 82% of bass clarinet instructors, and 74% of alto saxophone instructors responded that air volume should vary, with dynamic level again the most commonly cited factor, mentioned by 60% of saxophone instructors, 56% of bass clarinet instructors, and 44% of clarinet instructors. Musical factors—phrasing, expression, nuance, articulation, special effects—were cited by 32% of saxophone instructors, 28% of bass clarinet instructors, and 10% of soprano clarinet instructors. Register, too, was again a common response, mentioned by 24% of alto saxophone instructors, 17% of bass clarinet instructors, and 13% of soprano clarinet instructors. Desired variations in tone color (22% of bass clarinet instructors, 10% of soprano clarinet instructors, and 4% of alto saxophone instructors) also reappeared as a more common response. See Table 4 for a complete list of factors causing air volume variability. See Appendix B for tables for each instrument including separation of answers by participants’ primary instrument.

Table 4

Summary of air volume variability factors

	Overall CL	% Overall CL	Overall BCL	% Overall BCL	Overall SX	% Overall SX
Volume of air output:		(*n* = 39)		(*n* = 22)		(*n* = *34*)
Constant	6	15%	4	18%	9	26%
Variable	33	85%	18	82%	25	74%
Factors causing variation:		(*n* = 33)		(*n* = 18)		(*n* = 25)
dynamic level	17	44%	10	56%	15	60%
inseparable from air velocity	7	18%	1	6%	0	-
register	5	13%	3	17%	6	24%
variation of tone color	4	10%	4	22%	1	4%
musical context	4	10%	5	28%	8	32%
individual air capacity	3	8%	1	6%	2	8%
concerns of sound production	3	8%	1	6%	2	8%
resistance of each note	2	5%	0	-	0	-
intonation	1	3%	1	6%	0	-
variable, unspecified	0	-	1	6%	0	-
voicing	0	-	0	-	2	8%
extended techniques	0	-	0	-	2	8%
vibrato	0	-	0	-	1	4%

Note. Some participants indicated multiple responses.

Embouchure

Participants answered discrete questions about the role of the top lip, bottom lip, corners, chin, and jaw in embouchure formation separately for soprano clarinet, bass clarinet, and alto saxophone. I coded answers regarding the role of each component separately.

Top lip.

Regarding the role of the *top lip* in embouchure formation, 38% of soprano clarinet instructors indicated that it should engage downward toward the mouthpiece (coded to include responses including indicators such as pull down, push down, downward, or pressure), making this the most common response. The second-most common response for the role of the top lip in

soprano clarinet playing, cited by 36% of soprano clarinet instructors, was to complete the seal of the embouchure. Bass clarinet instructors indicated the same two roles most commonly but in the opposite order, with complete the seal most common (36%), followed by engage downward toward the mouthpiece (32%). Alto saxophone instructors achieved considerably more consensus in the role of the top lip, with 65% of participants indicating complete the seal to establish this as the most common response. Only 12% of alto saxophone instructors commented on the role of the top lip to engage downward in the formation of the alto saxophone embouchure. Alto saxophone instructors mentioned creating a round embouchure as the role of the top lip in embouchure formation at the same rate (12%), while no soprano clarinet or bass clarinet instructors mentioned this role. Further, 9% of alto saxophone instructors responded that the top lip should be relaxed, another role unmentioned by instructors of soprano clarinet or bass clarinet. Another notable discrepancy is 8% of soprano clarinet instructors citing the top lip's role in controlling the tone, whereas this factor went unmentioned by bass clarinet instructors and alto saxophone instructors. See Table 5 below for a full list of roles of the top lip in embouchure formation for soprano clarinet, bass clarinet, and alto saxophone. For complete results separated by instrument and further separated by participants' primary instrument, see Appendix C.

Table 5

Summary of top lip roles in embouchure formation

	Overall CL (*n* = 39)	% Overall CL	Overall BCL (*n* = 22)	% Overall BCL	Overall SX (*n* = 34)	% Overall SX
Roles:						
engage downward against mouthpiece	15	38%	7	32%	4	12%
complete seal	14	36%	8	36%	22	65%
overall embouchure support	7	18%	2	9%	2	6%
firm	6	15%	1	5%	2	6%
double-lip or simulated	6	15%	3	14%	1	3%
curl in	4	10%	3	14%	2	6%
control tone	3	8%	0	-	0	-
support chin	3	8%	1	5%	1	3%
overall embouchure stability	3	8%	2	9%	0	-
prevent biting	3	8%	1	5%	0	-
support corners	2	5%	1	5%	1	3%
control mechanism	1	3%	1	5%	0	-
resist inward push of mouthpiece	1	3%	0	-	1	3%
no curl	1	3%	1	5%	0	-
passive	1	3%	0	-	2	6%
allow free reed vibration	1	3%	0	-	0	-
balance bottom of embouchure	1	3%	1	5%	0	-
support bottom lip	1	3%	0	-	1	3%
support jaw	0	0%	2	9%	0	-
active	0	0%	1	5%	0	-
create space in oral cavity	0	0%	1	5%	0	-
create round embouchure	0	-	0	-	4	12%
relaxed	0	-	0	-	3	9%
anchor mouthpiece	0	-	0	-	1	3%
produce even pressure	0	-	0	-	1	3%
least important component	0	-	0	-	1	3%
spread evenly	0	-	0	-	1	3%
cushion	0	-	0	-	1	3%

Note. Some participants indicated multiple responses.

Bottom lip.

The most commonly mentioned role of the *bottom lip* in embouchure formation among soprano clarinet instructors (41%) and alto saxophone instructors (71%) was as a cushion. This response from alto saxophone instructors represents the strongest consensus in bottom lip roles for any instrument included in this study. Bass clarinet instructors listed the bottom lip's role as cushion as the second-most common response at 23%, behind allowing free vibration of the reed with 32%. Allowance of free reed vibration also attains a strong presence among answers from soprano clarinet instructors, indicated by 26% of responses, and to a lesser extent from alto saxophone instructors, mentioned in 12% of responses. The second-most common response among alto saxophone instructors (26%) for the bottom lip's role was to control the tone, an answer also represented, though less strongly, among soprano clarinet instructors (18%) and bass clarinet instructors (14%).

Some coded responses regarding the role of the bottom lip produced notable differences in rate of appearance. Soprano clarinet instructors and bass clarinet instructors respectively indicated the bottom lip's role as a point of contact for the reed at 21% and 23%. The same two subsets respectively mentioned the bottom lip's role as a point of contact for the instrument at 8% and 9%. Point of contact for reed or instrument appears nowhere among responses from alto saxophone instructors. Additionally, 14% of bass clarinet instructors described the role of the bottom lip as relaxed, a code appearing in only 3% of responses from both soprano clarinet instructors and alto saxophone instructors. Table 6 below includes a full list of roles of the top lip in embouchure formation for soprano clarinet, bass clarinet, and alto saxophone. Appendix C includes complete results separated by instrument and further separated by participants' primary instrument.

Table 6

Summary of bottom lip roles in embouchure formation

	Overall CL (n = 39)	% Overall CL	Overall BCL (n = 22)	% Overall BCL	Overall SX (n = 34)	% Overall SX
Roles:						
cushion	16	41%	5	23%	24	71%
allow free reed vibration	10	26%	7	32%	4	12%
point of contact with reed	8	21%	5	23%	0	-
firm	7	18%	1	5%	1	3%
control tone	7	18%	3	14%	9	26%
point of contact with instrument	3	8%	2	9%	0	-
flexibility	3	8%	4	18%	1	3%
complete seal	2	5%	1	5%	4	12%
prevent biting	2	5%	1	5%	0	-
overall embouchure support	2	5%	2	9%	3	9%
support reed vibration	2	5%	0	-	0	-
overall embouchure stability	2	5%	1	5%	1	3%
stationary	1	3%	1	5%	0	-
focus air	1	3%	0	-	0	-
not to over-support	1	3%	0	-	0	-
resist inward push of mouthpiece	1	3%	0	-	1	3%
subtle pressure changes	1	3%	0	-	1	3%
flat surface for reed	1	3%	1	5%	0	-
control pressure on reed	1	3%	2	9%	0	-
relaxed	1	3%	3	14%	1	3%
produce vibrato	0	-	0	-	3	9%
create round embouchure	0	-	0	-	2	6%
compress reed	0	-	0	-	1	3%
curled in	0	-	0	-	1	3%
passive	0	-	0	-	1	3%

Note. Some participants indicated multiple responses.

Corners.

The role of *corners* in embouchure formation presents similarly between soprano clarinet, bass clarinet, and alto saxophone. The most common response for all three instruments was to complete the seal of the embouchure, noted by 38% of soprano clarinet instructors, 38% of alto saxophone instructors, and 35% of bass clarinet instructors. The second-most common response for all three instruments was also the same, with 31% of soprano clarinet instructors, 29% of alto saxophone instructors, and 27% of bass clarinet instructors mentioning the role of the corners to push inward. Soprano clarinet instructors and bass clarinet instructors also shared the third-most common response, to create a round embouchure, indicated by 21% and 23% of participants, respectively. This response also appeared in 15% of answers from alto saxophone instructors, tied with overall embouchure support and support of the bottom lip as the fourth-most common role, behind control of tone as the third-most common response from alto saxophone instructors. For a complete list of roles of corners in embouchure formation, see Table 7 below. Appendix C includes roles of corners in embouchure formation broken down by instrument and by participants' primary instruments.

Table 7

Summary of corners roles in embouchure formation

	Overall CL (n = 39)	% Overall CL	Overall BCL (n = 22)	% Overall BCL	Overall SX (n = 34)	% Overall SX
Roles:						
complete seal	15	38%	7	32%	13	38%
push inward	12	31%	6	27%	10	29%
create round embouchure	8	21%	5	23%	5	15%
prevent biting	6	15%	2	9%	0	-
overall embouchure support	6	15%	2	9%	5	15%
control tone	4	10%	2	9%	6	18%
firm	3	8%	0	-	3	9%
support bottom lip	2	5%	2	9%	5	15%
high	2	5%	0	-	1	3%
push forward	1	3%	0	-	0	-
passive	1	3%	0	-	0	-
cradle reed	1	3%	1	5%	0	-
engage complete facial mask	1	3%	1	5%	0	-
pull downward	1	3%	1	5%	3	9%
focus airstream	1	3%	0	-	0	-
support top lip	1	3%	1	5%	3	9%
relaxed	0	-	1	5%	0	-
high	0	-	1	5%	0	-
support chin	0	-	1	5%	0	-
overall embouchure stability	0	-	1	5%	0	-
support jaw	0	-	1	5%	1	3%
equal pressure around embouchure	0	-	0	-	1	3%
support voicing	0	-	0	-	1	3%
most important component	0	-	0	-	1	3%
direct air	0	-	0	-	1	3%

Note. Some participants indicated multiple responses.

Chin.

Common responses for the role of the *chin* between soprano clarinet, bass clarinet, and alto saxophone appear together but in different order. Soprano clarinet instructors most commonly cited the chin's role as pointed downward (38%), followed closely by indications that the chin should be flat (36%). Responses from bass clarinet instructors also placed a flat chin as the second-most common role (23%), behind the most common response of a passive chin (27%). Alto saxophone instructors indicated flat chin most frequently (32%), followed by a passive chin (26%). Passive chin appears relatively high on the soprano clarinet list, as well, tied for the fourth-most common answer (13%).

As seen with the roles of the bottom lip in embouchure formation, some significant differences in response rate appeared. Controlling the tone as the chin's role appeared in 18% of responses from both soprano clarinet instructors and bass clarinet instructors but only in 3% of alto saxophone instructors. Alto saxophone instructors cited overall embouchure support as a role of the chin in 18% of responses, whereas only 3% of soprano clarinet instructors and no bass clarinet instructors mentioned this role. Fifteen percent (15%) of alto saxophone instructors indicated that the chin should be relaxed, in contrast to 5% of bass clarinet instructors and no clarinet instructors. For a complete list of roles of the bottom lip in embouchure formation, see Table 8. For roles of the chin in embouchure formation separated by instrument and broken down by participants' primary instrument, see Appendix C.

Table 8

Summary of chin roles in embouchure formation

	Overall CL (*n* = 39)	% Overall CL	Overall BCL (*n* = 22)	% Overall BCL	Overall SX (*n* = 34)	% Overall SX
Roles:						
point downward	15	38%	4	18%	5	15%
flat	14	36%	5	23%	11	32%
control tone	7	18%	4	18%	1	3%
firm	5	13%	0	-	1	3%
passive	5	13%	6	27%	9	26%
prevent biting	5	13%	1	5%	0	-
overall embouchure stability	4	10%	1	5%	1	3%
support bottom lip	4	10%	1	5%	3	9%
allow free reed vibration	3	8%	3	14%	1	3%
support jaw	1	3%	0	-	0	-
overall embouchure support	1	3%	0	-	6	18%
byproduct of corners	1	3%	1	5%	0	-
byproduct of bottom lip	1	3%	1	5%	0	-
byproduct of jaw	1	3%	1	5%	0	-
balance inward push of mouthpiece	1	3%	0	-	1	3%
stationary	1	3%	2	9%	0	-
supports instrument	1	3%	0	-	0	-
parallel to floor	1	3%	1	5%	0	-
create space in oral cavity	1	3%	0	-	0	-
support open embouchure	0	-	1	5%	0	-
relaxed	0	-	1	5%	5	15%
neutral	0	-	1	5%	0	-
flexible	0	-	0	-	1	3%
support corners	0	-	0	-	1	3%
slightly engaged	0	-	0	-	1	3%
natural	0	-	0	-	1	3%
special inflections	0	-	0	-	1	3%

Note. Some participants indicated multiple responses.

Jaw.

Responses for the roles of the *jaw* in embouchure formation produced the greatest variability of any embouchure component. Alto saxophone instructors reached the most consensus on this question with 35% mentioning vibrato as the jaw's role. Vibrato was absent from the responses of soprano clarinet instructors and bass clarinet instructors. The second-most common answer from alto saxophone instructors on the role of the jaw was control of tone (24%), again unmentioned by soprano clarinet instructors or bass clarinet instructors. The most common answer among bass clarinet instructors (23%) was that the jaw should be relaxed, followed by stationary (18%). Stationary was also tied for second among responses from clarinet instructors (15%) and tied for fourth among responses from alto saxophone instructors (15%). Overall embouchure stability was the most represented answer among soprano clarinet instructors (21%) but was notably less common from bass clarinet instructors and alto saxophone instructors (both 9%). Other roles frequently cited across instruments included in this study were overall embouchure support (18% from alto saxophone instructors, 15% from soprano clarinet instructors, and 9% from bass clarinet instructors) and support of the bottom lip (15% from alto saxophone instructors, 14% from bass clarinet instructors, and 13% from soprano clarinet instructors). For complete results on roles of jaw in embouchure formation across soprano clarinet, bass clarinet, and alto saxophone, see Table 9 below. For complete results by instrument, including the primary instrument of participants by response, see Appendix C.

Table 9

Summary of jaw roles in embouchure formation

	Overall CL (*n* = 39)	% Overall CL	Overall BCL (*n* = 22)	% Overall BCL	Overall SX (*n* = 34)	% Overall SX
Roles:						
overall embouchure stability	8	21%	2	9%	3	9%
stationary	6	15%	4	18%	5	15%
overall embouchure support	6	15%	2	9%	6	18%
support bottom lip	5	13%	3	14%	5	15%
neutral	5	13%	1	5%	1	3%
relaxed	5	13%	5	23%	6	18%
support chin	3	8%	0	-	0	-
control pressure against reed	3	8%	1	5%	2	6%
passive	3	8%	2	9%	1	3%
create space in oral cavity	3	8%	0	-	0	-
open	3	8%	3	14%	4	12%
forward	3	8%	2	9%	1	3%
receive wedge of mouthpiece	2	5%	0	-	1	3%
prevent biting	2	5%	3	14%	2	6%
allow free reed vibration	2	5%	1	5%	0	-
back	2	5%	1	5%	0	-
down	3	8%	1	5%	0	-
support voicing	2	5%	1	5%	2	6%
stable	1	3%	0	-	0	-
parallel to floor	1	3%	0	-	0	-
control airflow	1	3%	1	5%	0	-
flexibility	1	3%	1	5%	4	12%
correct placement	1	3%	1	5%	0	-
support larger air column	0	-	1	5%	0	-
drop to breathe	0	-	1	5%	0	-
vibrato	0	-	0	-	12	35%
control tone	0	-	0	-	8	24%
intonation	0	-	0	-	3	9%
support corners	0	-	0	-	1	3%
complete seal	0	-	0	-	1	3%
firm	0	-	0	-	1	3%

Note. Some participants indicated multiple responses.

Range of responses.

Roles of the *jaw* in embouchure formation produced the widest range of responses, with a total of 31 codes, including 15 mentioned by three or fewer participants across instruments. The second-greatest variety of answers comes from roles of the *top lip* in embouchure formation, totaling 28 codes, 17 of which received mention by three or fewer participants across instruments. Roles of the *chin* in embouchure formation follows with a total of 27 codes and 16 cited by three or fewer participants across instruments. Roles of *corners* and roles of *top lip* both have 25 codes. *Top lip* contains 17 codes referenced by three or fewer total participants across instruments. *Corners* includes 15 codes mentioned by three or fewer total participants across instruments. Because participants were asked to answer the same questions for all instruments on which they teach applied lessons, some of these codes that appear once per instrument (or once each for two instruments) come from the responses of the same participant.

Voicing

Voicing (widely understood to refer to the position of the tongue while playing) serves the performer as the internal oral component, in contrast to and in conjunction with embouchure (widely understood to refer to the position of the mouth while playing) which serves the performer as the external oral component. Participants were asked if the voicing for each instrument—soprano clarinet, bass clarinet, and alto saxophone—is consistent or variable throughout the instrument's range. The majority of artist-teachers teaching all three instruments indicated that voicing should be variable—64% of soprano clarinet instructors, 77% of bass clarinet instructors, and 94% of alto saxophone instructors. (Unlike coded response percentages, the dichotomy of answer choices produced a total of 100% on this question for each instrument;

thus, 36% of soprano clarinet instructors, 23% of bass clarinet instructors, and 6% of saxophone instructors responded that voicing should be consistent.)

The survey then asked all participants in a free response question which *syllable or syllables* they utilize for voicing. Responses of "consistent" prompted a question asking, "What is the consistent vowel sound used throughout the range of the soprano clarinet?" or "…bass clarinet?" or "…alto saxophone?" Reponses of "variable" led to a question asking, "Where and how do the vowel sounds change while playing soprano clarinet, and which vowel sounds do you use in which instances?" I then coded responses into categories—omitting from the summary table to follow categories containing only one response—including 1) ee/high tongue, 2) subtle adjustments, 3) French eu (as in deux), 4) ah low/ee high, 5) intuitive, 6) ew low/ee high, 7) ah, 8) eh, 9) consistent and shaped between ee and ay, 10) oh low, ah middle, ee high, 11) wide variety, 12) individual, 13) lower/more open than clarinet, 14) equipment dependent, and 15) not a factor in teaching.

The most common answer for soprano clarinet and bass clarinet was ee/high tongue, mentioned by 49% of soprano clarinet instructors and 27% of bass clarinet instructors, although only 6% of alto saxophone instructors included this in their responses. The second-most common voicing choice for soprano clarinet was subtle adjustments, noted by 23% of soprano clarinet instructors. This response appeared at lower rates for bass clarinet (9%) and alto saxophone (3%). The second-most common response for bass clarinet was lower/more open than soprano clarinet, indicated by 23% of bass clarinet instructors; just 3% of alto saxophone instructors used the same comparison for their instrument. The syllable explained as a French eu (as in the word *deux*) appeared among instructors of all three instruments, though represented more strongly among soprano clarinet instructors (18%) and bass clarinet instructors (14%) than

alto saxophone instructors (3%). Although only 15% of alto saxophone instructors mentioned it in their responses, the most common response among alto saxophone instructors was ah low/ee high, an answer also represented at lower rates among soprano clarinet instructors (8%) and bass clarinet instructors (9%). Less common but notable responses include 9% of bass clarinet instructors indicating that choices in voicing depend on the player's equipment, unmentioned by instructors of soprano clarinet or alto saxophone, and 9% of alto saxophone instructors stating that voicing is not a factor in their teaching. Table 10 below provides a summary of the most common responses regarding voicing syllables employed (omitting only those mentioned in a single response) in addition to a complete account of the consistency or variability of voicing. Appendix D contains tables including all reported syllables, as well as data compiled by participants' primary instruments. In the following summary table, instructors of soprano clarinet demonstrate the most consensus with six codes represented, followed by instructors of bass clarinet with nine codes represented. Responses from instructors of alto saxophone cover 13 codes. These same levels of variety in response appear in the complete, instrument-specific tables, as well, with answers of soprano clarinet instructors falling into 12 categories, answers of bass clarinet instructors comprising 13 categories, and answers of alto saxophone instructors demanding 28 separate categories.

Table 10

Summary of voicing syllable variability and choice

	CL overall (*n* = 39)	% CL overall	BCL overall (*n* = 22)	% BCL overall	SX overall (*n* = 34)	% SX overall
Consistent syllable	14	36%	5	23%	2	6%
Variable syllable	25	64%	17	77%	32	94%
Syllable						
ee/high tongue	19	49%	6	27%	2	6%
subtle adjustments	9	23%	2	9%	1	3%
French eu (as in deux)	7	18%	3	14%	1	3%
ah low/ee high	3	8%	2	9%	5	15%
intuitive	3	8%	0	-	1	3%
ew low/ee high	2	5%	0	-	0	-
ah	0	-	2	9%	1	3%
eh	0	-	1	5%	1	3%
consistent, shaped between ee and ay	0	-	0	-	2	6%
oh low, ah middle, ee high	0	-	0	-	2	6%
wide variety	0	-	0	-	2	6%
individual	0	-	2	9%	2	6%
lower/more open than clarinet	0	-	5	23%	1	3%
equipment dependent	0	-	2	9%	0	-
not a factor in teaching	0	-	0	-	3	9%

Note. Some participants indicated multiple responses.

Note. Only responses recorded more than once appear in this chart.

Discussion

The purpose of this study was to produce best-practices pedagogical approaches for soprano clarinet, bass clarinet, and alto saxophone, and distinction of differences between the instruments for teachers of multiple woodwind instruments. Research questions addressed by this study included 1) should air support during output on soprano clarinet, bass clarinet, and alto saxophone, respectively, remain constant or vary, and, if variable, which factors necessitate change? 2) what roles do the top lip, bottom lip, corners, chin, and jaw play in embouchure formation on soprano clarinet, bass clarinet, and alto saxophone, respectively? and 3) should voicing on soprano clarinet, bass clarinet, and alto saxophone, respectively, remain consistent or vary, and, if variable, which factors necessitate change?

Research question 1: Should air support during output on soprano clarinet, bass clarinet, and alto saxophone, respectively, remain constant or vary, and, if variable, which factors necessitate change?

The majority of participants stated that air support should remain constant during output for all three instruments considered in this study. When specifying air velocity or air volume, however, the majority of participants indicated that both components of air output should be variable. As speed and amount of air during output may (or must) change while the mechanism of air output remains the same, participants appear to consider air velocity and air volume during output independently from air support. The data therefore suggest the use of constant air support on soprano clarinet, bass clarinet, and alto saxophone. Although the majority of soprano clarinet instructors indicated constant air support, the relatively lower percentage in agreement compared to progressively higher percentages of bass clarinet instructors and alto saxophone instructors

may imply that a wider bore demands more consistency of air support, or perhaps the inverse, that the soprano clarinet's narrower bore forgives deviations in air support more readily. (Although the subset size of two raises scrutiny, both participants who indicated bass clarinet as their primary instrument said that air support on soprano clarinet should be variable while air support on bass clarinet should be constant, providing some direct comparison which suggests that future research may be able to discern practical differences in the employment of air support mechanisms within the body.)

Participants who indicated variable air support, however, may take a similar physical approach while applying an opposite conceptual approach. Among the minority of artist-teachers on all three instruments considered by this study who responded that they employ variable air support, the factor cited most commonly as necessitating that change was dynamic level, which was also the most prevalent explanation for varying air velocity and air volume for soprano clarinet, bass clarinet, and alto saxophone. Considering coded response data in six categories, air velocity for three instruments and air volume for three instruments, three categories—air velocity for alto saxophone (63%), air volume for bass clarinet (56%) and alto saxophone (60%)—demonstrate a convincing majority of participants altering one or both components of air output to produce changes in dynamic levels. Two others of the previously distinguished categories, in the absence of a majority, provide a convincing plurality. Forty-two percent (42%) of soprano clarinet instructors indicated dynamics as a governing factor of changes in air velocity, while the second-most common response, musical context, received only 23% of participants' explicit attention. Forty-four percent (44%) of soprano clarinet instructors mentioned dynamics as the driver of change in air volume, while the next-most common

response, indicating that velocity and volume are inseparable, received mention in 18% of responses.

The possibility exists for a great deal of overlap between dynamics, the most common response for factors requiring a change in air output, and musical context, a code encompassing references to nuance, taper, and phrasing. For instance, if a player were to produce nuance by a slight change in volume, some participants may also consider that an instance of dynamic variation. Taper at the end of a phrase, or other devices of phrase shaping, could receive the same consideration. Dynamics received specific mention frequently enough to convince me to assign it a specific code, although another reasonable observer could choose to include dynamics within the scope of musical context as defined for this study (or the reverse, to fold musical context into dynamics). This would create a much higher degree of consensus regarding the alteration of air velocity or air volume to produce changes in dynamics or musical context.

The present data raises a question it cannot answer: should we produce changes in dynamics by changing the amount of air or the speed of air we emit through the instrument? The differences in answer rate for dynamics as a factor of variability for air volume or air velocity for soprano clarinet (44% volume, 42% velocity) and alto saxophone (60% volume, 63% velocity) appear slim enough to discourage any strong conclusion. The difference for bass clarinet (56% volume, 46% velocity) leans slightly toward a preference for variation in volume of air. As with air support, however, the data suggests no differences in best practices between instruments in regard to variation of air velocity or air volume. From a pedagogical standpoint, the data suggests acknowledging increases and decreases in air stream and air speed due to changes in dynamics, musical context, register, or desired variation in tone color despite the consistency of air support. An interesting but less-represented answer—velocity and volume as inseparable

components of air output—deserves attention as it suggests that perhaps research concerned with distinguishing differences in the physical approach to the instrument will struggle to answer this question as it may be more conceptual in nature. Appendix B includes full results tables for air support, air velocity, and air volume for soprano clarinet, bass clarinet, and alto saxophone, including overall results and results by primary instrument, as well as summary comparison tables of overall results.

Research question 2: What roles do the top lip, bottom lip, corners, chin, and jaw play in embouchure formation on soprano clarinet, bass clarinet, and alto saxophone, respectively?

Although this study asked participants to consider five components of embouchure—top lip, bottom lip, corners, chin, and jaw—separately, the embouchure in practice is a closed system in which no single component adjusts independently without affecting any other component. Some participants acknowledged this in responses that indicated one component's role should be supporting another component or that the shape or position of one component is a byproduct of another. While data obtained from this study's survey explores each component with some specificity, the method of data collection creates some challenges in compiling a complete picture of embouchure.

Top lip.

The two most common responses for the role of the top lip in the formation of the soprano clarinet embouchure were to engage downward toward the mouthpiece (38%) and to complete the seal (34%). Although these may appear to include some degree of overlap, generally those who explain the role of an embouchure component as completing the seal intend

to imply that the player should apply only enough pressure to avoid air escaping. Understood this way, the top two answers actually represent different ends of a continuum, with engage downward representing a much higher degree of activity. This discrepancy seems to exist clearly in most responses indicating either of the two top roles, although there were five participants (13%) who mentioned both, indicating that not all soprano clarinet instructors view them as separate instructions in practice. As such, the response rate for either or both answers makes determining best practices for embouchure instruction regarding the top lip problematic. However, consideration of primary instrument as a determining factor—taking only responses from participants who indicate soprano clarinet as their primary instrument—the difference in response rate increases, with 44% of primary soprano clarinetists indicating that the top lip should engage downward toward the mouthpiece and 31% of primary soprano clarinetists indicating to complete the seal with the top lip. Even though this subset includes four of a total five participants who mentioned both, appealing to specialists reveals a best practice of engaging the top lip downward toward the mouthpiece. Further, although enough participants explicitly specified use of a double-lip embouchure to justify creation of a unique code, a reasonable researcher could decide that the engagement of the top lip between teeth and mouthpiece necessarily produces a similar downward pressure, resulting in an actual majority of 53% of participants (38% who indicated downward engagement plus 15% who indicated double-lip or simulated double-lip embouchure).

The data regarding top lip in embouchure formation for the bass clarinet presents the same problem as for the soprano clarinet, as the top two responses again are engaged downward toward the mouthpiece (32%) and complete the seal (36%). Appealing to specialists provides no assistance this time, as one of the two participants who indicated bass clarinet as their primary

instrument mentioned both and the other indicated neither. Combining responses referring to downward engagement with those referencing the double-lip or simulated double-lip embouchure, as discussed above in regard to the top lip in the soprano clarinet embouchure, provides a greater difference (50% of overall responses would thus indicate downward activity) but not quite a majority. Perhaps the difficulty in determining best practices for this component of embouchure formation on bass clarinet stems from the construction of the survey to consider each instrument separately. Participants were not asked for explicit comparisons between soprano clarinet and bass clarinet embouchures, and although some provided direct comparison in their responses, consideration of these comparisons bears no fruit. Two participants indicated that the top lip while playing bass clarinet is less active or firm than while playing soprano clarinet, and 11 participants did not answer the question beyond indicating that their answer was the same as what they provided for the same question regarding bass clarinet. However, one participant who indicated bass clarinet as his primary instrument wrote in his survey response, "Bass embouchure is *very* different from soprano. Soprano embouchure doesn't really translate well to bass clarinet." One major limitation of the results of this study is the paucity of responses from bass clarinet specialists. Although the response data indicates that perhaps the best-practices approach for top lip in bass clarinet embouchure formation is active engagement downward, the same as in soprano clarinet embouchure formation, future studies could reach a more representative sample of specialists on the bass clarinet (and perhaps exclude bass clarinet instructors who are not specialists).

The response data regarding the role of the top lip in alto saxophone embouchure formation contains no disagreements as seen above. Although a small percentage of responses indicated that the top lip should be engaged downward (12%), a true majority (65%) of responses

mentioned completing the seal as the role of the top lip. Fifteen percent (15%) of responses described the top lip of the alto saxophone embouchure as passive or relaxed, compared to just 6% of responses describing the top lip as firm. The best-practices approach to the top lip in alto saxophone embouchure formation is relaxed and applying just enough pressure to prevent air leakage. Compared to the soprano clarinet embouchure, the top lip engages less actively in the alto saxophone embouchure.

Bottom lip.

A convincing plurality (41%) of soprano clarinet instructors indicated that the bottom lip should serve as a cushion in soprano clarinet embouchure formation. To further define the role of the bottom lip in the soprano clarinet embouchure, as well as to pursue a majority in practice, I sorted codes representing survey responses into groups expressing a greater or lesser degree of active engagement of the bottom lip. When codes suggesting less activity combine into a larger constituency, the total number of instances equals 48 mentions (totaling 123% but bearing in mind that a number of participants indicated multiple codes within a single response). These codes indicating less activity include cushion, but also allowing free reed vibration, service as a point of contact for the reed or the clarinet, flexibility, prevention (or avoidance) of biting, completing the seal, not over-supporting, providing a flat surface, or being relaxed or stationary. Codes suggesting more activity in the bottom lip's role—firm, control tone, support reed vibration, focus air, resist the inward push of the mouthpiece, subtle pressure changes, and control pressure—combine to receive 20 mentions (present in 51% of responses). This combined data supports the initial plurality to suggest a best-practices approach of presenting the bottom lip as a relatively passive cushion for the reed in the formation of the soprano clarinet embouchure.

The most common answer for the role of the bottom lip in bass clarinet embouchure formation received attention from a less convincing plurality with 32% of responses mentioning allowance of free reed vibration. Grouping coded answers as above, into combinations representing greater or lesser active engagement, clarifies how to accomplish this freedom of vibration for the reed. Codes representing less activity include allow free reed vibration as well as point of contact for reed or instrument, cushion, flexible, relaxed, stationary, complete the seal, and prevent (or avoid) biting and were mentioned a collective total of 29 times in 22 responses (132%, as above, allowing for multiple codes represented in a single response). Codes representing greater activity include control the tone, control the pressure on the reed, flat, and firm and appeared a total of seven times (32%). As with soprano clarinet, the best practice for explanation of the bottom lip's role in bass clarinet embouchure formation appears to be relative passivity in providing a cushion to allow free vibration of the reed.

The survey data on the bottom lip in alto saxophone embouchure formation reveals a greater degree of consensus than either the soprano clarinet or bass clarinet embouchure's bottom lip role. Seventy-one percent (71%) of alto saxophone instructors indicated that the bottom lip should serve as a cushion for the reed. Elimination of responses from primary soprano clarinetists presents an almost identical response rate from primary alto saxophonists with 72% mentioning the bottom lip's role as a cushion. This study's stated goal of ascertaining differences in the physical approaches to the included instruments requires acknowledging similarities, as well, and as with soprano clarinet and bass clarinet, the survey data suggests a best-practices approach to the alto saxophone embouchure's bottom lip as a relatively passive cushion to support free reed vibration. A future study, however, could seek definable differences in how this conceptual similarity receives application across performers of single-reed

instruments. This study's survey cannot distinguish relative levels of engagement of the bottom lip, or any specific component, from instrument to instrument (or from player to player on the same instrument).

Corners.

Consideration of the role of the corners in the formation of the soprano clarinet embouchure revisits a familiar challenge. The top two answers, complete the seal (38%) and push inward (31%), received a similar number of mentions within responses from all soprano clarinet instructors. If tabulation of results includes only responses from participants who indicate soprano clarinet as a primary instrument, complete the seal and push inward both receive attention from 34% of responses, granting no greater clarity. As with the distinction between completing the seal and engaging downward toward the mouthpiece as discussed in consideration of the top lip in the soprano clarinet embouchure, while these competing codes may demonstrate a superficial similarity, completing the seal implies less pressure and less active engagement than pushing inward. Codes suggesting less active engagement of the corners—complete the seal, passive, and cradle the reed—appeared a total of 17 times (44%). Codes suggesting more active engagement of the corners—push inward, create a round embouchure, prevent biting, control the tone, firm, push forward or downward, engage the entire facial mask, and focus the airstream—appeared a total of 37 times (95%). The dual nature of preventing (or avoiding) biting requires some explanation, as it appears as a code suggesting less activity in consideration of the bottom lip but suggesting more activity when considering the corners. In terms of the role of the bottom lip, preventing or avoiding biting is more of a negative command, something to avoid or not to do. In short, responses coded as prevent biting for the bottom lip refer to maintaining the natural space between the reed and the teeth created by the lip's position

between them, whereas responses coded as prevent biting for the corners refer to shifting pressure from the bottom lip or jaw to the corners. (One participant stated this succinctly: "Corners in help[s] relieve bite.") To summarize and work toward a best-practices approach to corners in the formation of the soprano clarinet embouchure, while the most common single answer for the role of corners was to complete the seal (relatively passive), collective consideration of relative activity of the corners reveals greater consensus around the second-most common answer, corners pushing inward (more active).

The survey data regarding the role of the corners in bass clarinet embouchure formation presents a similar conclusion with somewhat less statistical support. The most common response for the corners' role in the bass clarinet embouchure was to complete the seal (32%), followed closely by pushing inward (27%). Grouping coded responses by more activity—pushing inward, creating a round embouchure, preventing biting, controlling the tone, engaging the complete facial mask, and pulling downward—reveals a majority consensus, with 17 total mentions within 22 total responses (77%). Coded responses grouped by less activity—completing the seal, relaxed, and cradling the reed—appeared nine times (41%). This data produces a smaller difference in percentages when compared to the same measures for soprano clarinet (a difference of 51% for soprano clarinet, 36% for bass clarinet), but this suggests less similarity between the physical approaches to the bass clarinet among participants rather than less activity in the corners in embouchure formation between the two instruments. The best-practices approach to bass clarinet embouchure formation regarding corners appears the same as for soprano clarinet, pushing inward to create a round embouchure. As discussed above, a future study improving the sample of bass clarinet specialist participants could produce data for a more informed best practice.

Completing the seal again appears as the most common response for the role of the corners in formation of the alto saxophone embouchure. As seen in consideration of corners for soprano clarinet and bass clarinet, however, grouping coded responses by more or less activity reveals the second-most common answer, push inward, to receive more consensus. The more active codes—push in, control tone, create a round embouchure, pull down, firm, equal pressure around embouchure, pulled up, and direct air—appear 30 times in 34 total responses (88%). The only code clearly identifiable as less active is complete the seal, which appears 13 times (38%). Because participants considered embouchure components separately while responding to the survey used in this study, response data does not always represent any participant's complete concept of embouchure. Common among saxophonists (and occasionally mentioned in this study's survey responses) is explaining the saxophone embouchure as a drawstring bag pulled shut, creating equal pressure for closure at any point around the aperture. Agreement or disagreement with this model of embouchure formation depends primarily upon the roles of the top and bottom lip and the pressure they exert, making little or no impact on the activity of the corners conceptually, although a more focused future study may be able to reveal differences in required pressure from the corners if pressure from the top or bottom lip increases or decreases. As with the soprano clarinet and bass clarinet, the best-practices approach suggested by the data appears to be more actively engaged corners, pushing in as part of forming the alto saxophone embouchure. As also noted previously, the limitations of the survey used to collect this data include an inability to distinguish degrees of difference in physical approach when the conceptual approach or explanation matches. Future studies may be constructed to place the relative engagement or variance of corners in embouchure formation across single reed

instruments or performers of the same instrument on a spectrum to allow for more specific consideration of differences in physical approach to inform differences in pedagogy.

Chin.

The top two most common responses for the chin's role in the formation of the soprano clarinet embouchure demonstrate two conceptual approaches to produce the same physical characteristic. Pointed down received the most mentions from participants (38%), followed closely by flat (36%). Instructing a student to produce a flat chin requires pointing or pulling down; pointing the chin down necessarily produces a flat chin. Separate codes that easily agree with this element of physical approach to soprano clarinet embouchure include firm (13%) and prevent biting (13%), accomplished by directing the pressure of the chin downward to reduce pressure applied to the reed through the bottom lip. No coded responses obviously disagree with this approach: although passive (13%) approaches deviation, responses receiving this code explained the position of the chin not as its own role but as the result of the other components of embouchure functioning correctly. In illustration, one participant responded to the survey question, "What is the role of the chin in soprano clarinet embouchure formation?" with, "Nothing. If all of the above," referring to questions of the same formula inquiring about the top lip, bottom lip, and corners, "is working, the chin results in a slightly concave appearance." The clear best-practices approach to the chin in soprano clarinet embouchure formation is pointed downward and flat.

The survey data for the chin's role in bass clarinet embouchure formation suggests a similar approach as the soprano clarinet data above, but more dissention exists within the survey results for this question. Pointed down and flat as coded categories combine to receive 9 mentions among 22 total responses, but passive is the most common response (6 mentions alone,

27%). The presence of relaxed and neutral as coded responses (even though each appears only once) suggest the possibility of less active engagement on bass clarinet than on soprano clarinet. The responses from which these codes came are, “Relaxed. Very similar to saxophone embouchure,” and, “Neutral chin—not as critical to play with a flat/pointed chin,” both from participants who indicated soprano clarinet as their primary instrument. The best practice for the chin’s role in the bass clarinet embouchure could arguably be either passive, different from the best practice for soprano clarinet, or pointed down and flat, the same as for the soprano clarinet. One of two bass clarinet specialist participants indicated that the chin should be flat, and the other’s response provides no disagreement, but such a small subset of primary bass clarinetists creates a problem for declaring anything approaching a definitive answer. As with other issues in which the data seems to produce a dispute, this problem could also present as a difference in degree rather than a difference in kind. The conceptual approach for the bass clarinet, pointed down and flat, may be equivalent to that of the soprano clarinet, but the apparent disagreement among responses could indicate a difference in practice. Further research capable of producing a spectrum of chin position across performers of single-reed instruments could produce a more definitive best-practices approach.

Seeking an approach to the chin’s role in the formation of the alto saxophone embouchure presents the same challenge as with the bass clarinet embouchure. Codes including flat, pointed down, and firm appear 17 times in 34 total responses. Codes disagreeing, including relaxed, flexible, and natural, appear 7 times in 34 total responses. Although the data resulting from this survey suggests more consensus around the same best-practices approach seen above for the soprano clarinet and bass clarinet, substantial disagreement exists to mitigate the strength of the conclusion in this limited sample. Nine responses indicated that the chin in the alto

saxophone embouchure should be passive, while another primary saxophonist participant—whose response was coded as slightly engaged—explained, “The chin is slightly engaged but not nearly to the extent of clarinet's ‘flat chin.’” This suggests, as discussed regarding the chin in the bass clarinet embouchure, a similar (or identical) conceptual approach that receives a different physical implementation, perhaps clarified by future research that produces a spectrum to allow for incremental comparisons between the soprano clarinet, bass clarinet, and alto saxophone.

Jaw.

The most common answer for the role of the jaw in the soprano clarinet embouchure was overall embouchure stability, mentioned in 21% of responses, followed by overall embouchure support and establishing a stationary position, both mentioned in 15% of responses. Overall embouchure stability and overall embouchure support are codes that encompass a variety of explanations of the role of the jaw that describe its function as foundational to the rest of the embouchure, allowing the other components to fulfill their roles, but unnecessary to consider beyond setting the correct position. More specific notions of the jaw’s role in support of the bottom lip (mentioned in 13% of responses), the chin (8%), and voicing (5%) also appear to agree. The best-practices approach to the jaw in the formation of the soprano clarinet embouchure, then, appears to be an emphasis on the jaw’s relationship to the other components of the embouchure through correct positioning. Determining the exact ideal position of the jaw for soprano clarinet playing reaches beyond the capabilities of the survey used in this study, but the relative frequency of coded answers capable of being grouped together seem to suggest that the jaw should be open and relaxed (including those two terms as codes, as well as neutral, down, and creating space in the oral cavity). This conflicts directly with responses of forward or

back, since the joint controlling the jaw can create forward or backward motion but not without introducing tension.

Survey results for the role of the jaw in the formation of the bass clarinet embouchure provide a more convincing consensus. The top four answers were relaxed (23%), stationary (18%), open (14%), and prevent biting (14%), indicating a clearer importance of an open and relaxed jaw than ascertained from data regarding the jaw in the soprano clarinet embouchure. One primary bass clarinetist responded to the survey question asking for the role of the jaw in bass clarinet embouchure formation with, "less pressure than clarinet to allow for larger air column," supporting the previous data's assertion that the bass clarinet requires a more open jaw position than the soprano clarinet. This suggests a best practice for explanation of the jaw in the formation of the bass clarinet embouchure of attention to the openness and relaxed quality of the jaw for the sake of its own contribution to production of the desired sound, in contrast to soprano clarinet in which the jaw's role more facilitates the contributions of other embouchure components.

Responses from alto saxophone instructors on the role of the jaw in embouchure formation suggests a more flexible and mobile jaw than found in soprano clarinet or bass clarinet playing. The most common response for the role of the jaw in alto saxophone embouchure formation was to produce vibrato, appearing in 35% of responses, and necessarily requiring a change in position to produce a change in sound. Relaxed (18%), open (12%), and flexible (12%) again appeared relatively often, suggesting a similar approach as seen above for bass clarinet. Again, however, a small number of responses present apparent disagreement, with 6% of responses indicating that the jaw should serve to compress the reed (an opposition to remaining open), and 15% of responses include mention of a stationary jaw (conflicting with the

flexibility implied above). While future studies may be able to explain this disagreement through more detailed explanations of various conceptions of the alto saxophone embouchure, the present data suggests a best-practices approach to the jaw's role in alto saxophone embouchure formation of relaxed, open flexibility.

Appendix C includes full results tables for roles of the top lip, bottom lip, corners, chin, and jaw for soprano clarinet, bass clarinet, and alto saxophone, including overall results and results by primary instrument, as well as summary comparison tables of overall results.

Research question 3: Should voicing on soprano clarinet, bass clarinet, and alto saxophone, respectively, remain consistent or vary, and, if variable, which factors necessitate change?

The majority of soprano clarinet instructors (64%) indicated that voicing varies while playing. Considering only responses from participants who marked soprano clarinet as their primary instrument still produces a majority but at a slightly lower percentage (59%). The choice of consistent or variable voicing, however, produces a false dichotomy. As one participant wrote,

> Regarding consistent or variable, I'm not entirely happy choosing one or the other. It mostly remains consistent but there are minute changes that happen…I have the most success telling students there is no change in the vowel or voicing because I think it helps them to develop a more consistent sound. Once they have a good concept of sound, they usually make the tiny changes that are necessary in the tongue placement.

Many participants on both sides of the consistent/variable question explicitly mentioned or implied the importance of subtle adjustments in the voicing, raising the question of how much

change in tongue placement may qualify as a consistent position and revealing the nature of this question as more conceptual than practical. The participant quoted above responded that voicing is consistent, but another participant who responded that voicing is variable wrote, "I use eu *consistently* [emphasis added]," when answering the subsequent question as to which vowel sounds to employ and when to change them.

All participants who teach applied soprano clarinet lessons, regardless of their responses of consistent or variable voicing, responded with the vowel or vowel sounds employed while playing soprano clarinet. A convincing plurality (49%) replied with ee as the single vowel produced by a high tongue position. If all responses including ee in any register combine, the data reveals a majority. French eu or German ö, produced with the ee vowel internally but shaped further with the lips, demonstrate another conceptual approach to producing the same tongue position throughout the range of the instrument. Coded responses that indicate the use of ee before shifting slightly in the highest register include ee/ü and ee/ö. Codes that specify the use of ee in the high register but a different vowel for lower registers include ah low/ee high, ew low/ee high, and eh low/ee high. Eighty-seven percent (87%) of soprano clarinet instructors indicated the use of the ee vowel in some part of the instrument's complete range, suggesting a pedagogical approach of emphasizing a high tongue position, especially in the upper register, while acknowledging subtle changes in voicing.

Overall results for voicing on bass clarinet reveal a conceptual similarity, as 77% of bass clarinet instructors responded that voicing should be variable. Among those bass clarinet instructors who indicated soprano clarinet as their primary instrument, the percentage advocating variable voicing is even higher (83%), a starkly higher rate than the percentage of primary soprano clarinetists who advocate variable voicing on soprano clarinet (59%). Although only

two primary bass clarinetists responded to this study's survey, they agree on soprano clarinet voicing as variable but split on the consistency or variability of bass clarinet voicing. Primary soprano clarinetists seem to agree that bass clarinet voicing requires a greater degree of change than soprano clarinet voicing, but future research consulting a more substantial sample of primary bass clarinetists may reveal disagreement along the line of specialization in bass clarinet performance.

Two answers tied for the most common response for the vowel or vowels employed for bass clarinet voicing. Twenty-three percent (23%) of bass clarinet instructors specified that the vowel on bass clarinet should be lower or more open than on soprano clarinet, mentioned by 22% of primary soprano clarinetists and 50% of primary alto saxophonists—but zero primary bass clarinetists—who teach applied lessons on bass clarinet. The limitations of this survey conceal the degree of difference, meaning that a lower vowel sound could present as a lower-adjusted ee or as a lower vowel such as ah. The other most common answer (23%), ee produced by a high tongue position, appeared in the responses of both primary bass clarinetists. Including all other coded responses that rely upon a high tongue position (French eu, ah low/ee high, and ö low/ee high in addition to ee/high tongue position), the survey data fails to reveal a majority but instead provides a convincing plurality, producing a collective total of appearances in 50% of responses. Vowels requiring a lower tongue position (ah, oo, and eh) appear in a collective total of only 23% of responses. This data suggests a pedagogical approach of emphasizing an ee vowel sound produced by a high tongue while acknowledging to students with experience on soprano clarinet that the tongue position may be relatively lower and subject to relatively more pronounced changes.

One less common but interesting response is that bass clarinet voicing may vary depending on equipment (9%), unmentioned by soprano clarinet instructors or alto saxophone instructors. This survey made no attempt to control for equipment, and differences between participants in instrument brands, mouthpiece dimensions, ligature styles, and reed strengths would exist on all three instruments considered by this study. The probable cause of inclusion of equipment dependence for bass clarinet comes from two prominent neck styles, presenting the mouthpiece to the player either more vertically like the soprano clarinet angle or more horizontally like the alto saxophone angle. In general, soprano clarinetists play with the most vertical mouthpiece angle, alto saxophonists play with the most horizontal angle, and bass clarinetists play with an angle somewhere in between. Although this study's data provides no further elaboration, future research may seek to clarify differences in voicing within and across single-reed instruments depending on mouthpiece angles from player to player and instrument to instrument. Any conclusive explanation requires further research, but this study hints at more variability in voicing benefitting a performer approaching a mouthpiece at a more horizontal angle.

As the above discussion alludes, alto saxophone instructors responded with the greatest variety of vowel sounds used for voicing in conjunction with the strongest consensus on any question asked by this study's survey, as 94% responded that voicing should be variable. Only two participants indicated consistent voicing for the alto saxophone, one primary alto saxophonist and one primary clarinetist, recognizing that some small degree of disagreement exists even among specialists. While reaching the most consensus on the issue of consistent or variable voicing, alto saxophone instructors reached the least on which vowels to employ in alto saxophone voicing. Of 28 response codes, only seven codes received mention in more than one

response, and only two codes appeared in more than two responses. The most common answer, included in 15% of responses, was ah low/ee high. However, two of five participants to include ah low/ee high were primary soprano clarinetists, meaning only three of 29 primary alto saxophonists (10%) identified this approach to voicing. The same number of primary alto saxophonists (10% of primary alto saxophonists, 9% of overall respondents) reported the second-most common answer, that voicing plays no role in teaching the alto saxophone.

Attempting to identify commonalities to reveal best practices presents a number of difficulties. Some vowel combination accounts directly contradict each other, such as one participant reporting use of aw in the low register and oo in the high register and another using oo in the lower register and ee in the high register, both agreeing that the vowel changes from low to high but disagreeing on the use of oo as a vowel to facilitate the low or high register. The largest possible collection available from the present data is a grouping of responses that use ah or aw as the lowest tongue position (corresponding to the low register) and ee as the highest tongue position (corresponding to the high register). By combining codes for ah/ee, aw/ee, ah/eh/ee, ah/ih/ee, aw/eh/ee, and ah/eh/ih/ee, this collective accounts for 10 responses, still only represented in 29% of responses. By broadening the scope of answers to include and adding oh/ah/ee, oh/aa-ee, oh/oo/ee, aw/oo, oo/ee, warmer vowels low, and darker vowels low/bright vowels high to the previous list, the collective appears in 53% of responses. While the survey did not specifically ask participants to define where in the alto saxophone's range the registers change, and some responses identify more or fewer distinct registers requiring a change in voicing, this study's data broadly recommends playing the alto saxophone with a lower tongue position in the lower register and a higher tongue position in the higher register. Future studies

may be able to identify actual differences in tongue position variability in practice and how physical positions align with vowels used as pedagogical concepts.

Appendix D includes full results tables for voicing consistency or variability and syllable choice for soprano clarinet, bass clarinet, and alto saxophone, including overall results and results by primary instrument, as well as summary comparison tables of overall results.

Limitations and Future Research

I intentionally constructed the survey primarily of open-ended free response questions to allow responses to establish how artist-teachers think and talk about concepts and components of the physical approach to their instruments. While the results consequently present a vocabulary and may allow future studies to approach greater consensus and clearer pictures of best practices, the survey for this study produced a large amount of data, some of which suggests the possibility of more disagreement among artist-teachers than may actually exist. For example, while some coded free response data appears mutually exclusive (for example, the top lip cannot both curl in and not curl), some apparent differences between responses could represent possibilities capable of coexisting (a firm top lip may either curl in or not curl). Further, beyond instances in which separately coded answers may contain some degree of overlap, reported answers contain only what each participant explicitly included in each response. A code's absence within a particular response does not necessarily indicate that the respondent would disagree with or seek to eliminate the presence of that concept or quality in the physical approach to the instrument.

Two additional limitations impact the depth and scope of the present study. In an attempt toward comprehensiveness, the survey became too long, potentially affecting the quality or completeness of responses due to survey fatigue. Excluding incomplete responses and those

completed over multiple sessions for which timing data becomes unreliable, the approximate mean time a participant spent with the survey was 17.41 minutes, ranging between 6.02 minutes and 39.57 minutes from the shortest to longest duration. Additionally, related to the previous limitation, the sample size for both the complete set of participants and for inherent subsets presents as small. Although each participant's response represents a valid example of university-level applied teaching, a greater sample size and equal representation of primary teachers on each instrument could alter percentages of results and degrees of consensus.

Conclusions

This study reveals considerable transfer of the physical approach to the instrument between soprano clarinet, bass clarinet, and alto saxophone but also specifies important differences valuable for instructors of any single-reed instrument. Performance on all three instruments benefits greatly from constant air support, more important from instrument to instrument as the bore widens. It is permissible and necessary, however, to vary air velocity and air volume to produce changes in dynamics, musical context, register, or desired variation in tone color.

Soprano clarinet instructors and performers may conceptualize the embouchure as consisting of a top lip that engages downward toward the mouthpiece, a bottom lip that provides a passive cushion for the reed, corners that push inward toward the mouthpiece, a chin that points downward and is flat, and a relaxed, open jaw that allows the other embouchure components to function properly. Bass clarinet instructors and performers may conceptualize the embouchure as consisting of a top lip that engages downward toward the mouthpiece but with less requisite pressure than in the soprano clarinet embouchure, a bottom lip that passively cushions the reed as

in the soprano clarinet embouchure, corners that push inward though less actively than on soprano clarinet, a chin that may either point down and be flat or take a more passive role, and an open, relaxed jaw that is more important independently for tone quality than in the soprano clarinet embouchure. Alto saxophone instructors and performers may conceptualize the embouchure as consisting of a relaxed top lip that applies just enough pressure to complete the seal, a bottom lip that serves as a passive cushion for the reed, corners that push inward (and have greater overall importance than in soprano clarinet or bass clarinet playing due to the reduced activity in other embouchure components), a chin that may either point downward and be flat or take a more passive role, and a relaxed, open jaw with more flexibility than required for soprano clarinet or bass clarinet. Important elements of difference in embouchure to consider between instruments are the saxophonist's relaxed top lip, the saxophonist's more active inward corners, more acceptable passivity or neutrality in the bass clarinetist's or saxophonist's chin, the bass clarinetist's jaw's role in tone quality, and the saxophonist's jaw's increased flexibility.

The consistency or variability of voicing appears (especially for soprano clarinet, and somewhat for bass clarinet) to be a conceptual question, requiring a decision on how much change in tongue position is permissible to still be considered consistent. For all three instruments, some change in tongue position will occur while changing registers, with the least change in soprano clarinet playing, relatively more change in bass clarinet playing, and the most change in alto saxophone playing. The most useful vowel for use on the soprano clarinet is ee, produced with a high tongue position, especially in the high register. The same vowel is used on the bass clarinet in concept, although performers with experience on soprano clarinet may notice the tongue in a slightly lower position in practice, as well as relatively more pronounced adjustments in voicing as compared to soprano clarinet. Alto saxophone voicing requires much

more adjustment in tongue position and employs a lower position in the lower register and a higher position in the higher register. Table 11 takes the conclusions discussed above and places them side-by-side.

Table 11
Summary of conclusions in comparison

	Soprano Clarinet	Bass Clarinet	Alto Saxophone
Air Support	Constant		
Air Velocity & Air Volume	vary to produce changes in dynamics, register, musical context, or desired variations in tone color		
Embouchure			
Top Lip	engage downward toward mouthpiece	(less pressure than clarinet)	just enough pressure to complete seal
Bottom Lip	passive cushion for reed		
Corners	push inward	(less active than clarinet)	(more important than clarinet or bass clarinet)
Chin	flat, points downward	or, passive	
Jaw	relaxed, open		
	(supports other components)	(more important to tone than clarinet)	(more flexible than clarinet or bass clarinet)
Voicing	ee/high tongue	(lower than clarinet)	lower vowel (ex. ah) in low register, higher vowel (ex. ee) in high register

Results of the study revealed that applied instructors prioritize air support, embouchure, and voicing similarly and show some consensus but greater variety in conceptual approach and vocabulary used to express physical components of performance. These similarities in presentation of the physical approach to the instrument, at least conceptually, indicate a bias in pedagogy toward sameness, reaffirming the purpose of the study but indicating a need for further investigation. In instances when the general concept or description of a component of the physical approach toward one instrument presents as identical or exceedingly similar between two or three instruments, the survey's design and resultant responses make discerning the degree of difference impossible, although some such measures, if possible, would produce information without practical applicability. Differences supporting comparative pedagogy require clearer definition through future research.

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Appendix A: Survey

Thank you for offering your expertise on single-reed pedagogy. You will first complete a consent form and a media release before continuing to the survey.

To participate in this research study, you must give consent. Please read the following and click yes or no to give or withhold your consent. Clicking yes is the equivalent of an electronic signature.

CONSENT TO PARTICIPATE IN RESEARCH

Title of Research: Comparative Pedagogy: Soprano Clarinet, Bass Clarinet, and Alto Saxophone

Funding Agency/Sponsor: none

Study Investigators: Laura Singletary, co-major professor, Principal Investigator; William Hayter, DMA candidate

What is the purpose of the research? The purpose of this study is to determine the commonalities and differences in performance of soprano clarinet, bass clarinet, and alto saxophone as defined by artist-teachers, considering the physical approach to each instrument, including embouchure, voicing, air support, and articulation.

How many people will participate in this study? Approximately 500 people will be contacted via email.

What is my involvement for participating in this study? If you agree to be in the study, we will ask you to do the following things: You will be asked to complete a survey containing questions about soprano clarinet, bass clarinet, and alto saxophone pedagogy; you will only be asked questions about the instruments you teach.

How long am I expected to be in this study for and how much of my time is required?

The survey should take approximately 15 minutes. Your participation is complete after finishing the survey.

What are the risks to me for participating in this study and how will they be minimized?

This is minimal-risk research, and the only potential risk to you is lack of confidentiality. To control for this risk, only the researchers will have access to survey data, and no attempt will be made to identify any participant. You will have the option to give consent through a media release form to allow the researchers to use anonymous quotations from your responses.

What are the benefits for participating in this study?

While many pedagogical resources exist, most such materials focus on the experience and expertise of one artist-teacher. The potential benefit of this study is its possible innovative contribution to best practices teaching methods for soprano clarinet, bass clarinet, and saxophone, and distinction of differences between the instruments for teachers of multiple woodwindinstruments.

Will I be compensated for participating in this study?

No.

What is an alternate procedure(s) that I can choose instead of participating in this study?

There is no alternate procedure to participate. Should you choose not to participate, simply ignore or delete the email or discontinue the survey.

How will my confidentiality be protected?

After using the survey data for research purposes, the responses will be stored in a password protected file on the researcher's computer and will not be accessed, after which they will be destroyed, unless specific permission is given by the participant for the responses to be quoted in future scholarship. You have the option to consent to a media release form to allow the researchers to use anonymous quotations from your response. If quotes are used, no names or identifying information will be included; teachers will be referred to as teacher A, teacher B, etc., if reference is required. Should the subject withhold consent, the researchers will not use quotes from their responses in any public forum.

Is my participation voluntary?

Yes, you have a choice regarding participation.

Can I stop taking part in this research?

Yes, you can stop taking part in this research at any time.

What are the procedures for withdrawal?

To withdraw from the study, simply stop responding to the survey and close the browser window.

Will I be given a copy of the consent document to keep?

This survey will be completed electronically, including the consent document. You can save the consent document as a screenshot or print it for your records.

Who should I contact if I have questions regarding the study?

William Hayter, TCU DMA candidate, (832) 441-4834, w.m.hayter@tcu.edu; or Laura Singletary, Principal Investigator, TCU assistant professor of music education, (817) 257-4958, l.singletary@tcu.edu

Who should I contact if I have concerns regarding my rights as a study participant?

Dr. Michael Faggella-Luby, Chair, TCU Institutional Review Board, (817) 257-4355, m.faggella-luby@tcu.edu; or Ms. Lorrie Branson, JD, TCU Research Integrity Officer, (817) 257-4266, l.branson@tcu.edu.

Participant Agreement. Clicking yes below indicates that you have read or been read the information in this consent and agree to participate in this study. You have had a chance to ask any questions you have and they have been answered. You understand that I will be given a copy of this form for my records.

- ○ Yes, I consent and agree to participate in this research study.
- ○ No, I do not consent and do not agree to participate in this research study.

As part of this study, a media record of your written responses will be made. Please indicate if you will permit the following uses of this media record. Note that you may refuse to permit this usage and still complete the study with a meaningful contribution. As with the consent document, your clicked responses regarding media release are equivalent to your electronic signature on a legal document.

The media record(s) can be studied by the research team for use in this research project.
The media record(s) can be shown/played to subjects in other research studies.

- ○ Yes, the media record can be used as listed immediately above. No, the
- ○ media record cannot be used as listed immediately above.

The media records(s) and/or their transcriptions can be used for scientific or scholarly publications.
The media records(s) and/or their transcriptions can be used at scholarly conferences, meetings, or workshops.
The media records(s) and/or their transcriptions can be used in classrooms.

- ○ Yes, the media record can be used as listed above. No, the
- ○ media record cannot be used as listed above.

The media record(s) can be shown/played in public presentations.
The media record(s) can be shown/played on television, radio, or other broadcast media.
The media record(s) can be shown/played on the Internet/World Wide Web.

○ Yes, the media record can be used as listed immediately above. No, the

○ media record cannot be used as listed immediately above.

What is your primary instrument?

- ○ Soprano Clarinet
- ○ Bass Clarinet Alto
- ○ Saxophone

Do you teach applied lessons on soprano clarinet?

- ○ Yes
- ○ No

Which resources that include instructions in prose on how to play or teach the soprano clarinet do you recommend to your students or other teachers?

Click and drag to rank the following from most important to least important for tone production on the soprano clarinet:

- Embouchure
- Voicing
- Air support

What is the role of the top lip in soprano clarinet embouchure formation?

What is the role of the bottom lip in soprano clarinet embouchure formation?

What is the role of the corners in soprano clarinet embouchure formation?

What is the role of the chin in soprano clarinet embouchure formation?

What is the role of the jaw in soprano clarinet embouchure formation?

On soprano clarinet, is the voicing consistent throughout the instrument's range, or is the voicing variable throughout the range?

- ○ Consistent
- ○ Variable

What is the consistent vowel sound used throughout the range of the soprano clarinet?

Where and how do the vowel sounds change while playing soprano clarinet, and which vowel sounds do you use in which instances?

On soprano clarinet, should the player accomplish separation between staccato notes by keeping the tongue against the reed, by stopping the air stream, or both? If only one way, which one? If both, what factors determine the appropriate method?

When teaching soprano clarinet, do you teach vibrato?

- Yes
- No

Which statement better describes vibrato as used on soprano clarinet?

- Vibrato is a fundamental element of the tone.
- Vibrato is a momentary expressive gesture.

While playing soprano clarinet, where is the primary motion that produces vibrato?

- Throat
- Diaphragm
- Jaw

Do you use a repeated syllable to illustrate the motion of vibrato when teaching soprano clarinet?

- ○ Yes
- ○ No

What repeated syllable do you use to illustrate the motion of vibrato when teaching soprano clarinet?

While playing the soprano clarinet, the air support during output should be

- Constant
- Variable

Which factors cause air support to change while playing the soprano clarinet?

While playing the soprano clarinet, the velocity of the air output should be

- Constant
- Variable

Which factors cause the velocity of the air output to change while playing the soprano clarinet?

While playing the soprano clarinet, the volume of the air output should be

- Constant
- Variable

Which factors cause the volume of the air output to change while playing the soprano clarinet?

Do you teach applied lessons on bass clarinet?

- Yes
- No

Which resources that include instructions in prose on how to play or teach the bass clarinet do you recommend to your students or other teachers?

Click and drag to rank the following from most important to least important for tone production on the bass clarinet:

- Embouchure
- Voicing
- Air support

What is the role of the top lip in bass clarinet embouchure formation?

What is the role of the bottom lip in bass clarinet embouchure formation?

What is the role of the corners in bass clarinet embouchure formation?

What is the role of the chin in bass clarinet embouchure formation?

What is the role of the jaw in bass clarinet embouchure formation?

On bass clarinet, is the voicing consistent throughout the instrument's range, or is the voicing variable throughout the range?

- ○ Consistent
- ○ Variable

What is the consistent vowel sound used throughout the range of the bass clarinet?

Where and how do the vowel sounds change while playing bass clarinet, and which vowel sounds do you use in which instances?

On bass clarinet, should the player accomplish separation between staccato notes by keeping the tongue against the reed, by stopping the air stream, or both? If only one way, which one? If both, what factors determine the appropriate method?

When teaching bass clarinet, do you teach vibrato?

- Yes
- No

Which statement better describes vibrato as used on bass clarinet?

- Vibrato is a fundamental element of the tone.
- Vibrato is a momentary expressive gesture.

While playing bass clarinet, where is the primary motion that produces vibrato?

- Throat
- Diaphragm
- Jaw

Do you use a repeated syllable to illustrate the motion of vibrato when teaching bass clarinet?

- ○ Yes
- ○ No

What repeated syllable do you use to illustrate the motion of vibrato when teaching bass clarinet?

While playing the bass clarinet, the air support during output should be

- Constant
- Variable

Which factors cause air support to change while playing the bass clarinet?

While playing the bass clarinet, the velocity of the air output should be

- Constant
- Variable

Which factors cause the velocity of the air output to change while playing the bass clarinet?

While playing the bass clarinet, the volume of the air output should be

- Constant
- Variable

Which factors cause the volume of the air output to change while playing the bass clarinet?

Do you teach applied lessons on alto saxophone?

- ○ Yes
- ○ No

Which resources that include instructions in prose on how to play or teach the alto saxophone do you recommend to your students or other teachers?

Click and drag to rank the following from most important to least important for tone production on the alto saxophone.

- Embouchure
- Voicing
- Air support

What is the role of the top lip in alto saxophone embouchure formation?

What is the role of the bottom lip in alto saxophone embouchure formation?

What is the role of the corners in alto saxophone embouchure formation?

What is the role of the chin in alto saxophone embouchure formation?

What is the role of the jaw in alto saxophone embouchure formation?

On alto saxophone, is the voicing consistent throughout the instrument's range, or is the voicing variable throughout the range?

- ○ Consistent
- ○ Variable

What is the consistent vowel sound used throughout the range of the alto saxophone?

Where and how do the vowel sounds change while playing alto saxophone, and which vowel sounds do you use in which instances?

On alto saxophone, should the player accomplish separation between staccato notes by keeping the tongue against the reed, by stopping the air stream, or both? If only one way, which one? If both, what factors determine the appropriate method?

When teaching alto saxophone, do you teach vibrato?

- ○ Yes
- ○ No

Which statement better describes vibrato as used on alto saxophone?

- ○ Vibrato is a fundamental element of the tone.
- ○ Vibrato is a momentary expressive gesture.

While playing alto saxophone, where is the primary motion that produces vibrato?

- ○ Throat
- ○ Diaphragm
- ○ Jaw

Do you use a repeated syllable to illustrate the motion of vibrato when teaching alto saxophone?

- ○ Yes
- ○ No

What repeated syllable do you use to illustrate the motion of vibrato when teaching alto saxophone?

While playing the alto saxophone, the air support during output should be

- Constant
- Variable

Which factors cause air support to change while playing the alto saxophone?

While playing the alto saxophone, the velocity of the air output should be

- Constant
- Variable

Which factors cause the velocity of the air output to change while playing the alto saxophone?

While playing the alto saxophone, the volume of the air output should be

- Constant
- Variable

Which factors cause the volume of the air output to change while playing the alto saxophone?

Appendix B: Air Support

Table B1

Soprano clarinet air support variability factors (N = 39)

	Overall	% Overall	Primary CL	% Primary CL	Primary BCL	% Primary BCL	Primary SX	% Primary SX
Air support during output:	(N = 39)		(n = 32)		(n = 2)		(n = 5)	
Constant	**30**	**77%**	25	78%	0	0%	5	100%
Variable	**9**	**23%**	7	22%	2	100%	0	0%
Factors causing variation:	(n = 9)		(n = 7)		(n = 2)		(n = 0)	
dynamic level	**5**	**56%**	5	71%	0	0%	-	-
register	**2**	**22%**	1	14%	1	50%	-	-
resistance of each note	**2**	**22%**	1	14%	1	50%	-	-
variation of tone color	**2**	**22%**	2	29%	0	0%	-	-

Note. Some participants indicated multiple responses.

Table B2

Soprano clarinet air velocity variability factors (N = 39)

	Overall	% Overall	Primary CL	% Primary CL	Primary BCL	% Primary BCL	Primary SX	% Primary SX
Velocity of air output:		(*N* = 39)		(*n* = 32)		(*n* = 2)		(*n* = 5)
Constant	**13**	**33%**	10	31%	1	50%	2	40%
Variable	**26**	**67%**	22	69%	1	50%	3	60%
Factors causing variation:		(*n* = 26)		(*n* = 22)		(*n* = 1)		(*n* = 3)
dynamic level	**11**	**42%**	9	41%	0	-	2	67%
register	**5**	**19%**	4	18%	0	-	1	33%
resistance of each note	**2**	**8%**	1	5%	1	100%	0	-
variation of tone color	**3**	**12%**	3	14%	0	-	0	-
intonation	**1**	**4%**	1	5%	0	-	0	-
musical context	**6**	**23%**	6	27%	0	-	0	-
individual air capacity	**1**	**4%**	1	5%	0	-	0	-
concerns of sound production	**3**	**12%**	3	14%	0	-	0	-
inseparable from volume	**1**	**4%**	0	0%	0	-	1	33%

Note. Some participants indicated multiple responses.

Table B3

Soprano clarinet air volume variability factors (N = 39)

	Overall	% Overall	Primary CL	% Primary CL	Primary BCL	% Primary BCL	Primary SX	% Primary SX
Volume of air output		(*N* = 39)		(*n* = 32)		(*n* = 2)		(*n* = 5)
Constant	**6**	**15%**	5	16%	1	50%	0	0%
Variable	**33**	**85%**	27	84%	1	50%	5	100%
Factors causing variation:		(*n* = 33)		(*n* = 27)		(*n* = 1)		(*n* = 5)
dynamic level	**17**	**44%**	14	52%	0	-	3	60%
register	**5**	**13%**	4	15%	0	-	1	20%
resistance of each note	**2**	**5%**	1	4%	1	100%	0	-
variation of tone color	**4**	**10%**	4	15%	0	-	0	-
intonation	**1**	**3%**	1	4%	0	-	0	-
musical context	**4**	**10%**	3	11%	0	-	1	20%
individual air capacity	**3**	**8%**	2	7%	0	-	1	20%
concerns of sound production	**3**	**8%**	3	11%	0	-	0	-
inseparable from velocity	**7**	**18%**	4	15%	1	100%	2	40%

Note. Some participants indicated multiple responses.

Table B4

Bass clarinet air support variability factors (N = 22)

	Overall	% Overall	Primary BCL	% Primary BCL	Primary CL	% Primary CL	Primary SX	% Primary SX
Air support during output:		(*N* = 22)		(*n* = 2)		(*n* = 18)		(*n* = 2)
Constant	**18**	**82%**	2	100%	14	78%	2	100%
Variable	**4**	**18%**	0	-	4	22%	0	-
Factors causing variation:		(*n* = 4)		(*n* = 0)		(*n* = 4)		(*n* = 0)
dynamic level	**4**	**100%**	-	-	4	100%	-	-
voicing	**1**	**25%**	-	-	1	25%	-	-
musical context	**1**	**25%**	-	-	1	25%	-	-

Note. Some participants indicated multiple responses.

Table B5

Bass clarinet air velocity variability factors (N = 22)

	Overall	% Overall	Primary BCL	% Primary BCL	Primary CL	% Primary CL	Primary SX	% Primary SX
Velocity of air output:		(*N* = 22)		(*n* = 2)		(*n* = 18)		(*n* = 2)
Constant	**9**	**41%**	0	-	8	44%	1	50%
Variable	**13**	**59%**	2	100%	10	56%	1	50%
Factors causing variation:		(*n* = 13)		(*n* = 2)		(*n* = 10)		(*n* = 1)
dynamic level	**6**	**46%**	1	50%	4	40%	1	100%
register	**5**	**38%**	1	50%	3	30%	1	100%
musical context	**5**	**38%**	1	50%	4	40%	0	-
variation of tone color	**3**	**23%**	0	-	2	20%	1	100%
resistance of each note	**1**	**8%**	1	50%	0	-	0	-
intonation	**1**	**8%**	0	-	1	10%	0	-
concerns of sound production	**1**	**8%**	0	-	1	10%	0	-

Note. Some participants indicated multiple responses.

Table B6

Bass clarinet air volume variability factors (N = 22)

	Overall	% Overall	Primary BCL	% Primary BCL	Primary CL	% Primary CL	Primary SX	% Primary SX
Volume of air output		(*N* = 22)		(*n* = 2)		(*n* = 18)		(*n* = 2)
Constant	**4**	**18%**	0	-	4	22%	0	-
Variable	**18**	**82%**	2	100%	14	78%	2	100%
Factors causing variation:		(*n* = 18)		(*n* = 2)		(*n* = 14)		(*n* = 2)
dynamic level	**10**	**56%**	0	-	9	64%	1	50%
musical context	**5**	**28%**	1	50%	4	29%	0	-
variation of tone color	**4**	**22%**	0	-	3	21%	1	50%
register	**3**	**17%**	0	-	2	14%	1	50%
intonation	**1**	**6%**	0	-	1	7%	0	-
individual air capacity	**1**	**6%**	0	-	0	-	1	50%
concerns of sound production	**1**	**6%**	0	-	1	7%	0	-
inseparable from velocity	**1**	**6%**	0	-	1	7%	0	-
variable, unspecified	**1**	**6%**	1	50%	0	-	0	-

Note. Some participants indicated multiple responses.

Table B7

Alto saxophone air support variability factors (N = 34)

	Overall	% Overall	Primary SX	% Primary SX	Primary CL	% Primary CL
Air support during output:		(*N* = *34*)		(*n* = 29)		(*n* = 5)
Constant	**31**	**91%**	26	90%	5	100%
Variable	**3**	**9%**	3	10%	0	-
Factors causing variation:		(*n* = 3)		(*n* = 3)		(*n* = 0)
dynamic level	**1**	**33%**	1	33%	-	-
musical context	**1**	**33%**	1	33%	-	-
extended techniques	**1**	**33%**	1	33%	-	-

Note. No participants who indicate bass clarinet as their primary instrument teach applied saxophone; therefore, that column is absent from this table.

Table B8

Alto saxophone air velocity variability factors (N = 34)

	Overall	% Overall	Primary SX	% Primary SX	Primary CL	% Primary CL
Air support during output:		(*N = 34*)		(*n* = 29)		(*n* = 5)
Constant	**7**	**21%**	6	21%	1	20%
Variable	**27**	**79%**	23	79%	4	80%
Factors causing variation:		(*n* = 27)		(*n* = 23)		(*n* = 4)
dynamic level	**17**	**63%**	14	61%	3	75%
musical context	**8**	**30%**	7	30%	1	25%
register	**8**	**30%**	8	35%	0	-
concerns of sound production	**4**	**15%**	3	13%	1	25%
variation of tone color	**3**	**11%**	3	13%	0	-
extended techniques	**2**	**7%**	2	9%	0	-
voicing	**2**	**7%**	2	9%	0	-

Note. Some participants indicated multiple responses.
Note. No participants who indicate bass clarinet as their primary instrument teach applied saxophone; therefore, that column is absent from this table.

Table B9

Alto saxophone air volume variability factors (N = 34)

	Overall	% Overall	Primary SX	% Primary SX	Primary CL	% Primary CL
Volume of air output		(*N = 34*)		(*n* = 29)		(*n* = 5)
Constant	**9**	**26%**	6	21%	3	60%
Variable	**25**	**74%**	23	79%	2	40%
Factors causing variation:		(*n* = 25)		(*n* = 23)		(*n* = 2)
dynamics	**15**	**60%**	14	61%	1	50%
musical context	**8**	**32%**	8	35%	0	-
register	**6**	**24%**	6	26%	0	-
concerns of sound production	**2**	**8%**	1	4%	1	50%
voicing	**2**	**8%**	1	4%	0	-
individual capacity	**2**	**8%**	2	9%	0	-
extended techniques	**2**	**8%**	2	9%	0	-
vibrato	**1**	**4%**	1	4%	0	-
variations of tone color	**1**	**4%**	1	4%	0	-

Note. Some participants indicated multiple responses.
Note. No participants who indicate bass clarinet as their primary instrument teach applied saxophone; therefore, that column is absent from this table.

Table B10

Summary of air support variability factors

	Overall CL	% Overall CL	Overall BCL	% Overall BCL	Overall SX	% Overall SX
Air support during output:		(*n* = 39)		(*n* = 22)		(*n* = *34*)
Constant	30	77%	18	82%	31	91%
Variable	9	23%	4	18%	3	9%
Factors affecting variability:		(*n* = 9)		(*n* = 4)		(*n* = 3)
dynamic level	5	56%	4	100%	1	33%
register	2	22%	0	-	0	-
resistance of each note	2	22%	0	-	0	-
variation of tone color	2	22%	0	-	0	-
musical context	0	-	1	25%	1	33%
voicing	0	-	1	25%	0	-
extended techniques	0	-	0	-	1	33%

Note. Some participants indicated multiple responses.

Table B11

Summary of air velocity variability factors

	Overall CL	% Overall CL	Overall BCL	% Overall BCL	Overall SX	% Overall SX
Velocity of air output:		(*n* = 39)		(*n* = 22)		(*n* = 34)
Constant	13	33%	9	41%	7	21%
Variable	26	67%	13	59%	27	79%
Factors causing variation:		(*n* = 26)		(*n* = 13)		(*n* = 27)
dynamic level	11	42%	6	46%	17	63%
musical context	6	23%	5	38%	8	30%
register	5	19%	5	38%	8	30%
variation of tone color	3	12%	3	23%	3	11%
concerns of sound production	3	12%	1	8%	0	-
resistance of each note	2	8%	1	8%	0	-
intonation	1	4%	1	8%	0	-
individual air capacity	1	4%	0	-	0	-
inseparable from volume	1	4%	0	-	0	-
extended techniques	0	-	0	-	2	7%
voicing	0	-	0	-	2	7%

Note. Some participants indicated multiple responses.

Table B12

Summary of air volume variability factors

	Overall CL	% Overall CL	Overall BCL	% Overall BCL	Overall SX	% Overall SX
Volume of air output:		(*n* = 39)		(*n* = 22)		(*n* = *34*)
Constant	6	15%	4	18%	9	26%
Variable	33	85%	18	82%	25	74%
Factors causing variation:		(*n* = 33)		(*n* = 18)		(*n* = 25)
dynamic level	17	44%	10	56%	15	60%
inseparable from velocity	7	18%	1	6%	0	-
register	5	13%	3	17%	6	24%
variation of tone color	4	10%	4	22%	1	4%
musical context	4	10%	5	28%	8	32%
individual air capacity	3	8%	1	6%	2	8%
concerns of sound production	3	8%	1	6%	2	8%
resistance of each note	2	5%	0	-	0	-
intonation	1	3%	1	6%	0	-
variable, unspecified	0	-	1	6%	0	-
voicing	0	-	0	-	2	8%
extended techniques	0	-	0	-	2	8%
vibrato	0	-	0	-	1	4%

Note. Some participants indicated multiple responses.

Appendix C: Embouchure

Table C1

Soprano clarinet embouchure: top lip roles (N = 39)

	Overall	% Overall	Primary CL	% Primary CL (n = 32)	Primary BCL	% Primary BCL (*n* = 2)	Primary SX	% Primary SX (n = 5)
Role:								
engage downward against mouthpiece	15	38%	14	44%	1	50%	0	-
complete seal	14	36%	10	31%	1	50%	3	60%
overall embouchure support	7	18%	6	19%	1	50%	0	-
firm	6	15%	6	19%	0	-	0	-
double-lip or simulated	6	15%	5	16%	0	-	1	20%
curl in	4	10%	3	9%	0	-	1	20%
control tone	3	8%	3	9%	0	-	0	-
support chin	3	8%	3	9%	0	-	0	-
overall embouchure stability	3	8%	3	9%	0	-	0	-
prevent biting	3	8%	3	9%	0	-	0	-
support corners	2	5%	2	6%	0	-	0	-
control mechanism	1	3%	1	3%	0	-	0	-
resist inward push of mouthpiece	1	3%	1	3%	0	-	0	-
no curl	1	3%	1	3%	0	-	0	-
passive	1	3%	0	-	0	-	1	20%
allow free reed vibration	1	3%	1	3%	0	-	0	-
balance bottom of embouchure	1	3%	1	3%	0	-	0	-
support bottom lip	1	3%	1	3%	0	-	0	-

Note: Some participants indicated multiple responses.

Table C2

Soprano clarinet embouchure: bottom lip roles (N = 39)

	Overall	% Overall	Primary CL	% Primary CL (n = 32)	Primary BCL	% Primary BCL (*n* = 2)	Primary SX	% Primary SX (n = 5)
Role:								
cushion	16	41%	12	38%	1	50%	3	60%
allow free reed vibration	10	26%	9	28%	0	-	1	20%
reed point of contact	8	21%	8	25%	0	-	0	-
firm	7	18%	7	22%	0	-	0	-
control tone	7	18%	5	16%	0	-	2	40%
point of contact with clarinet	3	8%	3	9%	0	-	0	-
flexibility	3	8%	3	9%	0	-	0	-
complete seal	2	5%	2	6%	0	-	0	-
prevent biting	2	5%	2	6%	0	-	0	-
overall embouchure support	2	5%	2	6%	0	-	0	-
support reed vibration	2	5%	2	6%	0	-	0	-
overall embouchure stability	2	5%	2	6%	0	-	0	-
stationary	1	3%	1	3%	0	-	0	-
focus air	1	3%	0	-	1	50%	0	-
not to over-support	1	3%	0	-	1	50%	0	-
resist inward push of mouthpiece	1	3%	1	3%	0	-	0	-
subtle pressure changes	1	3%	1	3%	0	-	0	-
flat surface for reed	1	3%	1	3%	0	-	0	-
control pressure	1	3%	1	3%	0	-	0	-
relaxed	1	3%	1	3%	0	-	0	-

Note. Some participants indicated multiple responses.

Table C3

Soprano clarinet embouchure: corners roles (N = 39)

	Overall	% Overall	Primary CL	% Primary CL (n = 32)	Primary BCL	% Primary BCL (*n* = 2)	Primary SX	% Primary SX (n = 5)
Role:								
complete seal	15	38%	11	34%	1	50%	3	60%
push inward	12	31%	11	34%	0	-	1	20%
create round embouchure	8	21%	6	19%	2	100%	0	-
prevent biting	6	15%	6	19%	0	-	0	-
overall embouchure support	6	15%	5	16%	0	-	1	20%
control tone	4	10%	4	13%	0	-	0	-
firm	3	8%	3	9%	0	-	0	-
support bottom lip	2	5%	2	6%	0	-	0	-
high	2	5%	0	-	0	-	2	40%
push forward	1	3%	1	3%	0	-	0	-
passive	1	3%	1	3%	0	-	0	-
cradle reed	1	3%	0	-	0	-	1	20%
engage complete facial mask	1	3%	1	3%	0	-	0	-
pull downward	1	3%	1	3%	0	-	0	-
focus airstream	1	3%	0	-	0	-	1	20%
support top lip	1	3%	1	3%	0	-	0	-

Table C4

Soprano clarinet embouchure: chin roles (N = 39)

	Overall	% Overall	Primary CL	% Primary CL (n = 32)	Primary BCL	% Primary BCL (*n* = 2)	Primary SX	% Primary SX (n = 5)
Role:								
point downward	15	38%	12	38%	0	-	3	60%
flat	14	36%	11	34%	1	50%	2	40%
control tone	7	18%	6	19%	0	-	1	20%
firm	5	13%	5	16%	0	-	0	-
passive	5	13%	4	13%	0	-	1	20%
prevent biting	5	13%	5	16%	0	-	0	-
overall embouchure stability	4	10%	4	13%	0	-	0	-
support bottom lip	4	10%	4	13%	0	-	0	-
allow free reed vibration	3	8%	3	9%	0	-	0	-
support jaw	1	3%	0	-	1	50%	0	-
overall embouchure support	1	3%	0	-	1	50%	0	-
byproduct of corners	1	3%	0	-	0	-	1	20%
byproduct of bottom lip	1	3%	0	-	1	50%	0	-
byproduct of jaw	1	3%	0	-	1	50%	0	-
balance inward push of mouthpiece	1	3%	1	3%	0	-	0	-
stationary	1	3%	1	3%	0	-	0	-
supports instrument	1	3%	1	3%	0	-	0	-
parallel to floor	1	3%	1	3%	0	-	0	-
create space in oral cavity	1	3%	0	-	0	-	1	20%

Note. Some participants indicated multiple responses.

Table C5

Soprano clarinet embouchure: jaw roles (N = 39)

	Overall	% Overall	Primary CL	% Primary CL (n = 32)	Primary BCL	% Primary BCL (*n* = 2)	Primary SX	% Primary SX (n = 5)
Role:								
overall embouchure stability	8	21%	8	25%	0	-	0	-
stationary	6	15%	6	19%	0	-	1	20%
overall embouchure support	6	15%	5	16%	0	-	1	20%
support bottom lip	5	13%	5	16%	0	-	0	-
neutral	5	13%	4	13%	1	50%	0	-
relaxed	5	13%	4	13%	0	-	1	20%
support chin	3	8%	3	9%	0	-	0	-
control pressure against reed	3	8%	2	6%	0	-	1	20%
passive	3	8%	3	9%	0	-	0	-
create space in oral cavity	3	8%	3	9%	0	-	0	-
open	3	8%	3	9%	0	-	0	-
forward	3	8%	3	9%	0	-	0	-
receive wedge of mouthpiece	2	5%	2	6%	0	-	0	-
prevent biting	2	5%	1	3%	0	-	1	20%
allow free reed vibration	2	5%	2	6%	0	-	0	-
back	2	5%	2	6%	0	-	0	-
down	3	8%	2	6%	1	50%	0	-
support voicing	2	5%	2	6%	0	-	0	-
stable	1	3%	1	3%	0	-	0	-
parallel to floor	1	3%	0	-	1	50%	0	-
control airflow	1	3%	1	3%	0	-	0	-
flexibility	1	3%	1	3%	0	-	0	-
correct placement	1	3%	1	3%	0	-	0	-

Note. Some participants indicated multiple responses.

Table C6

Bass clarinet embouchure: top lip roles (N = 22)

	Overall	% Overall	Primary BCL	% Primary BCL (n = 2)	Primary CL	% Primary CL (*n* = 18)	Primary SX	% Primary SX (n = 2)
Role:								
complete seal	8	36%	1	50%	6	33%	1	50%
engaged downward	7	32%	1	50%	6	33%	0	-
double-lip or simulated	3	14%	0	-	3	17%	1	50%
curl in	3	14%	0	-	3	17%	0	-
support jaw	2	9%	1	50%	1	6%	0	-
overall embouchure support	2	9%	0	-	2	11%	0	-
overall embouchure stability	2	9%	0	-	2	11%	0	-
control mechanism	1	5%	0	-	1	6%	0	-
firm	1	5%	0	-	1	6%	0	-
prevent biting	1	5%	1	50%	0	-	0	-
active	1	5%	0	-	1	6%	0	-
no curl	1	5%	0	-	1	6%	0	-
support chin	1	5%	0	-	1	6%	0	-
create space in oral cavity	1	5%	0	-	1	6%	0	-
support corners	1	5%	0	-	1	6%	0	-
balance bottom of embouchure	1	5%	0	-	1	6%	0	-

Note. Some participants indicated multiple responses

Table C7

Bass clarinet embouchure: bottom lip roles (N = 22)

	Overall	% Overall	Primary BCL	% Primary BCL (*n* = 2)	Primary CL	% Primary CL (*n* = 18)	Primary SX	% Primary SX (*n* = 2)
Role:								
allow free reed vibration	7	32%	1	50%	5	28%	1	50%
reed point of contact	5	23%	0	-	5	28%	0	-
cushion	5	23%	0	-	4	22%	1	50%
flexible	4	18%	0	-	4	22%	0	-
relaxed	3	14%	1	50%	2	11%	0	-
control tone	3	14%	0	-	1	6%	2	100%
control pressure on reed	2	9%	1	50%	1	6%	0	-
clarinet point of contact	2	9%	0	-	2	11%	0	-
overall embouchure support	2	9%	0	-	2	11%	0	-
stationary	1	5%	0	-	1	6%	0	-
complete seal	1	5%	0	-	1	6%	0	-
flat	1	5%	0	-	1	6%	0	-
prevent biting	1	5%	0	-	1	6%	0	-
firm	1	5%	0	-	1	6%	0	-
overall embouchure stability	1	5%	0	-	1	6%	0	-

Note. Some participants indicated multiple responses

Table C8

Bass clarinet embouchure: corners roles (N = 22)

	Overall	% Overall	Primary BCL	% Primary BCL (*n* = 2)	Primary CL	% Primary CL (*n* = 18)	Primary SX	% Primary SX (*n* = 2)
Role:								
complete seal	7	32%	1	50%	6	33%	0	-
push inward	6	27%	0	-	5	28%	1	50%
create round embouchure	5	23%	1	50%	4	22%	0	-
support bottom lip	2	9%	0	-	2	11%	0	-
prevent biting	2	9%	0	-	2	11%	0	-
overall embouchure support	2	9%	0	-	2	11%	0	-
control tone	2	9%	0	-	2	11%	0	-
relaxed	1	5%	1	50%	0	-	0	-
high	1	5%	0	-	0	-	1	50%
cradle reed	1	5%	0	-	0	-	1	50%
engage mask	1	5%	0	-	1	6%	0	-
support chin	1	5%	0	-	1	6%	0	-
overall embouchure stability	1	5%	0	-	1	6%	0	-
pull downward	1	5%	0	-	1	6%	0	-
support top lip	1	5%	0	-	1	6%	0	-
support jaw	1	5%	0	-	1	6%	0	-

Note. Some participants indicated multiple responses

Table C9

Bass clarinet embouchure: chin roles (N = 22)

	Overall	% Overall	Primary BCL	% Primary BCL (*n* = 2)	Primary CL	% Primary CL (*n* = 18)	Primary SX	% Primary SX (*n* = 2)
Role:								
passive	6	27%	0	-	5	28%	1	50%
flat	5	23%	1	50%	4	22%	0	-
control tone	4	18%	0	-	4	22%	0	-
pointed down	4	18%	0	-	3	17%	1	50%
allow free reed vibration	3	14%	0	-	3	17%	0	-
stationary	2	9%	0	-	2	11%	0	-
support open embouchure	1	5%	1	50%	0	-	0	-
byproduct of corners	1	5%	0	-	0	-	1	50%
byproduct of bottom lip	1	5%	1	50%	0	-	0	-
prevent biting	1	5%	0	-	1	6%	0	-
overall stability	1	5%	0	-	1	6%	0	-
parallel to floor	1	5%	0	-	1	6%	0	-
relaxed	1	5%	0	-	1	6%	0	-
support bottom lip	1	5%	0	-	1	6%	0	-
neutral	1	5%	0	-	1	6%	0	-
byproduct of jaw	1	5%	1	50%	0	-	0	-

Note. Some participants indicated multiple responses

Table C10

Bass clarinet embouchure: jaw roles (N = 22)

	Overall	% Overall	Primary BCL	% Primary BCL (*n* = 2)	Primary CL	% Primary CL (*n* = 18)	Primary SX	% Primary SX (*n* = 2)
Role:								
relaxed	5	23%	0	-	4	22%	1	50%
stationary	4	18%	0	-	3	17%	1	50%
open	3	14%	0	-	3	17%	0	-
prevent biting	3	14%	0	-	2	11%	1	50%
support bottom lip	3	14%	0	-	3	17%	0	-
passive	2	9%	0	-	2	11%	0	-
overall stability	2	9%	0	-	2	11%	0	-
forward	2	9%	0	-	2	11%	0	-
overall embouchure support	2	9%	0	-	1	6%	1	50%
neutral	1	5%	1	50%	0	0%	0	-
support larger air column	1	5%	1	50%	0	0%	0	-
control airflow to reed	1	5%	0	-	1	6%	0	-
allow free reed vibration	1	5%	0	-	1	6%	0	-
back	1	5%	0	-	1	6%	0	-
down	1	5%	0	-	1	6%	0	-
drop to breathe	1	5%	0	-	1	6%	0	-
support voicing	1	5%	0	-	1	6%	0	-
correct placement	1	5%	0	-	1	6%	0	-
control pressure against reed	1	5%	0	-	1	6%	0	-
flexible	1	5%	0	-	1	6%	0	-

Note. Some participants indicated multiple responses

Table C11

Alto saxophone embouchure: top lip roles (N = 34)

	Overall	% Overall	Primary SX	% Primary SX (n = 29)	Primary CL	% Primary CL (*n* = 5)
Role:						
complete seal	22	65%	19	66%	3	60%
engaged downward	4	12%	3	10%	1	20%
create round embouchure	4	12%	3	10%	1	20%
relaxed	3	9%	3	10%	0	-
passive	2	6%	2	7%	0	-
overall embouchure support	2	6%	1	3%	1	20%
firm	2	6%	2	7%	0	-
curled in	2	6%	2	7%	0	-
anchor mouthpiece	1	3%	1	3%	0	-
produce even pressure	1	3%	1	3%	0	-
support chin	1	3%	1	3%	0	-
support bottom lip	1	3%	1	3%	0	-
least important component	1	3%	0	-	1	20%
resist inward push of mouthpiece	1	3%	0	-	1	20%
double-lip or simulated	1	3%	0	-	1	20%
spread evenly	1	3%	1	3%	0	-
cushion	1	3%	1	3%	0	-
support corners	1	3%	1	3%	0	-

Note. Some participants indicated multiple responses

Note. No participants who indicate bass clarinet as their primary instrument teach applied saxophone; therefore, that column is absent from this table.

Table C12

Alto saxophone embouchure: bottom lip roles (N = 34)

	Overall	% Overall	Primary SX	% Primary SX (n = 29)	Primary CL	% Primary CL (*n* = 5)
Role:						
cushion	24	71%	21	72%	3	60%
control tone	9	26%	9	31%	0	-
allow free reed vibration	4	12%	4	14%	0	-
complete seal	4	12%	3	10%	1	20%
overall embouchure support	3	9%	3	10%	2	40%
produce vibrato	3	9%	2	7%	1	20%
create round embouchure	2	6%	2	7%	0	-
compress reed	1	3%	1	3%	0	-
resist inward push of mouthpiece	1	3%	0	-	1	20%
subtle pressure changes	1	3%	0	-	1	20%
curled in	1	3%	1	3%	0	-
firm	1	3%	1	3%	0	-
overall embouchure stability	1	3%	1	3%	0	-
flexibility	1	3%	0	-	1	20%
passive	1	3%	1	3%	0	-
relaxed	1	3%	1	3%	0	-

Note. Some participants indicated multiple responses

Note. No participants who indicate bass clarinet as their primary instrument teach applied saxophone; therefore, that column is absent from this table.

Table C13

Alto saxophone embouchure: corners roles (N = 34)

	Overall	% Overall	Primary SX	% Primary SX (n = 29)	Primary CL	% Primary CL (*n* = 5)
Role:						
complete seal	13	38%	10	34%	3	60%
push in	10	29%	8	28%	2	40%
control tone	6	18%	6	21%	0	-
support bottom lip	5	15%	5	17%	0	-
create round embouchure	5	15%	4	14%	1	20%
overall embouchure support	5	15%	4	14%	1	20%
support top lip	3	9%	3	10%	0	-
pulled down	3	9%	3	10%	0	-
firm	3	9%	1	3%	2	40%
equal pressure around embouchure	1	3%	1	3%	0	-
support jaw	1	3%	1	3%	0	-
support voicing	1	3%	1	3%	0	-
pulled up	1	3%	1	3%	0	-
most important component	1	3%	1	3%	0	-
direct air	1	3%	1	3%	0	-

Note. Some participants indicated multiple responses

Note. No participants who indicate bass clarinet as their primary instrument teach applied saxophone; therefore, that column is absent from this table.

Table C14

Alto saxophone embouchure: chin roles (N = 34)

	Overall	% Overall	Primary SX	% Primary SX (n = 29)	Primary CL	% Primary CL (*n* = 5)
Role:						
flat	11	32%	11	38%	0	-
passive	9	26%	7	24%	2	40%
overall embouchure support	6	18%	5	17%	1	20%
pointed down	5	15%	4	14%	1	20%
relaxed	5	15%	4	14%	1	20%
support bottom lip	3	9%	2	7%	1	20%
allow free reed vibration	1	3%	1	3%	0	-
flexible	1	3%	0	-	1	20%
balance inward push of mouthpiece	1	3%	0	-	1	20%
support corners	1	3%	1	3%	0	-
slightly engaged	1	3%	1	3%	0	-
natural	1	3%	1	3%	0	-
control tone	1	3%	1	3%	0	-
special inflections	1	3%	1	3%	0	-
overall embouchure stability	1	3%	1	3%	0	-
firm	1	3%	1	3%	0	-

Note. Some participants indicated multiple responses

Note. No participants who indicate bass clarinet as their primary instrument teach applied saxophone; therefore, that column is absent from this table.

Table C15

Alto saxophone embouchure: jaw roles (N = 34)

	Overall	% Overall	Primary SX	% Primary SX (n = 29)	Primary CL	% Primary CL (*n* = 5)
Role:						
vibrato	12	35%	11	38%	1	20%
control tone	8	24%	8	28%	0	-
overall embouchure support	6	18%	5	17%	1	20%
relaxed	6	18%	5	17%	1	20%
support bottom lip	5	15%	5	17%	0	-
stationary	5	15%	5	17%	0	-
open	4	12%	3	10%	1	20%
flexible	4	12%	3	10%	1	20%
overall embouchure stability	3	9%	2	7%	1	20%
intonation	3	9%	3	10%	0	-
prevent biting	2	6%	2	7%	0	-
support voicing	2	6%	2	7%	0	-
compress reed	2	6%	2	7%	0	-
neutral	1	3%	0	-	1	20%
receives wedge of mouthpiece	1	3%	0	-	1	20%
support corners	1	3%	1	3%	0	-
passive	1	3%	1	3%	0	-
forward	1	3%	1	3%	0	-
complete seal	1	3%	1	3%	0	-
firm	1	3%	1	3%	0	-

Note. Some participants indicated multiple responses

Note. No participants who indicate bass clarinet as their primary instrument teach applied saxophone; therefore, that column is absent from this table.

Table C16
Summary of top lip roles in embouchure formation

	Overall CL (n = 39)	% Overall CL	Overall BCL (n = 22)	% Overall BCL	Overall SX (n = 34)	% Overall SX
Roles:						
engage downward against mouthpiece	15	38%	7	32%	4	12%
complete seal	14	36%	8	36%	22	65%
overall embouchure support	7	18%	2	9%	2	6%
firm	6	15%	1	5%	2	6%
double-lip or simulated	6	15%	3	14%	1	3%
curl in	4	10%	3	14%	2	6%
control tone	3	8%	0	-	0	-
support chin	3	8%	1	5%	1	3%
overall embouchure stability	3	8%	2	9%	0	-
prevent biting	3	8%	1	5%	0	-
support corners	2	5%	1	5%	1	3%
control mechanism	1	3%	1	5%	0	-
resist inward push of mouthpiece	1	3%	0	-	1	3%
no curl	1	3%	1	5%	0	-
passive	1	3%	0	-	2	6%
allow free reed vibration	1	3%	0	-	0	-
balance bottom of embouchure	1	3%	1	5%	0	-
support bottom lip	1	3%	0	-	1	3%
support jaw	0	0%	2	9%	0	-
active	0	0%	1	5%	0	-
create space in oral cavity	0	0%	1	5%	0	-
create round embouchure	0	-	0	-	4	12%
relaxed	0	-	0	-	3	9%
anchor mouthpiece	0	-	0	-	1	3%
produce even pressure	0	-	0	-	1	3%
least important component	0	-	0	-	1	3%
spread evenly	0	-	0	-	1	3%
cushion	0	-	0	-	1	3%

Note. Some participants indicated multiple responses.

Table C17
Summary of bottom lip roles in embouchure formation

	Overall CL (*n* = 39)	% Overall CL	Overall BCL (*n* = 22)	% Overall BCL	Overall SX (*n* = 34)	% Overall SX
Roles:						
cushion	16	41%	5	23%	24	71%
allow free reed vibration	10	26%	7	32%	4	12%
point of contact with reed	8	21%	5	23%	0	-
firm	7	18%	1	5%	1	3%
control tone	7	18%	3	14%	9	26%
point of contact with instrument	3	8%	2	9%	0	-
flexibility	3	8%	4	18%	1	3%
complete seal	2	5%	1	5%	4	12%
prevent biting	2	5%	1	5%	0	-
overall embouchure support	2	5%	2	9%	3	9%
support reed vibration	2	5%	0	-	0	-
overall embouchure stability	2	5%	1	5%	1	3%
stationary	1	3%	1	5%	0	-
focus air	1	3%	0	-	0	-
not to over-support	1	3%	0	-	0	-
resist inward push of mouthpiece	1	3%	0	-	1	3%
subtle pressure changes	1	3%	0	-	1	3%
flat surface for reed	1	3%	1	5%	0	-
control pressure on reed	1	3%	2	9%	0	-
relaxed	1	3%	3	14%	1	3%
produce vibrato	0	-	0	-	3	9%
create round embouchure	0	-	0	-	2	6%
compress reed	0	-	0	-	1	3%
curled in	0	-	0	-	1	3%
passive	0	-	0	-	1	3%

Note. Some participants indicated multiple responses.

Table C18
Summary of corners roles in embouchure formation

	Overall CL (*n* = 39)	% Overall CL	Overall BCL (*n* = 22)	% Overall BCL	Overall SX (*n* = 34)	% Overall SX
Roles:						
complete seal	15	38%	7	32%	13	38%
push inward	12	31%	6	27%	10	29%
create round embouchure	8	21%	5	23%	5	15%
prevent biting	6	15%	2	9%	0	-
overall embouchure support	6	15%	2	9%	5	15%
control tone	4	10%	2	9%	6	18%
firm	3	8%	0	-	3	9%
support bottom lip	2	5%	2	9%	5	15%
high	2	5%	0	-	1	3%
push forward	1	3%	0	-	0	-
passive	1	3%	0	-	0	-
cradle reed	1	3%	1	5%	0	-
engage complete facial mask	1	3%	1	5%	0	-
pull downward	1	3%	1	5%	3	9%
focus airstream	1	3%	0	-	0	-
support top lip	1	3%	1	5%	3	9%
relaxed	0	-	1	5%	0	-
high	0	-	1	5%	0	-
support chin	0	-	1	5%	0	-
overall embouchure stability	0	-	1	5%	0	-
support jaw	0	-	1	5%	1	3%
equal pressure around embouchure	0	-	0	-	1	3%
support voicing	0	-	0	-	1	3%
most important component	0	-	0	-	1	3%
direct air	0	-	0	-	1	3%

Note. Some participants indicated multiple responses.

Table C19
Summary of chin roles in embouchure formation

	Overall CL (n = 39)	% Overall CL	Overall BCL (n = 22)	% Overall BCL	Overall SX (n = 34)	% Overall SX
Roles:						
point downward	15	38%	4	18%	5	15%
flat	14	36%	5	23%	11	32%
control tone	7	18%	4	18%	1	3%
firm	5	13%	0	-	1	3%
passive	5	13%	6	27%	9	26%
prevent biting	5	13%	1	5%	0	-
overall embouchure stability	4	10%	1	5%	1	3%
support bottom lip	4	10%	1	5%	3	9%
allow free reed vibration	3	8%	3	14%	1	3%
support jaw	1	3%	0	-	0	-
overall embouchure support	1	3%	0	-	6	18%
byproduct of corners	1	3%	1	5%	0	-
byproduct of bottom lip	1	3%	1	5%	0	-
byproduct of jaw	1	3%	1	5%	0	-
balance inward push of mouthpiece	1	3%	0	-	1	3%
stationary	1	3%	2	9%	0	-
supports instrument	1	3%	0	-	0	-
parallel to floor	1	3%	1	5%	0	-
create space in oral cavity	1	3%	0	-	0	-
support open embouchure	0	-	1	5%	0	-
relaxed	0	-	1	5%	5	15%
neutral	0	-	1	5%	0	-
flexible	0	-	0	-	1	3%
support corners	0	-	0	-	1	3%
slightly engaged	0	-	0	-	1	3%
natural	0	-	0	-	1	3%
special inflections	0	-	0	-	1	3%

Note. Some participants indicated multiple responses.

Table C20

Summary of jaw roles in embouchure formation

	Overall CL (*n* = 39)	% Overall CL	Overall BCL (*n* = 22)	% Overall BCL	Overall SX (*n* = 34)	% Overall SX
Roles:						
overall embouchure stability	8	21%	2	9%	3	9%
stationary	6	15%	4	18%	5	15%
overall embouchure support	6	15%	2	9%	6	18%
support bottom lip	5	13%	3	14%	5	15%
neutral	5	13%	1	5%	1	3%
relaxed	5	13%	5	23%	6	18%
support chin	3	8%	0	-	0	-
control pressure against reed	3	8%	1	5%	2	6%
passive	3	8%	2	9%	1	3%
create space in oral cavity	3	8%	0	-	0	-
open	3	8%	3	14%	4	12%
forward	3	8%	2	9%	1	3%
receive wedge of mouthpiece	2	5%	0	-	1	3%
prevent biting	2	5%	3	14%	2	6%
allow free reed vibration	2	5%	1	5%	0	-
back	2	5%	1	5%	0	-
down	3	8%	1	5%	0	-
support voicing	2	5%	1	5%	2	6%
stable	1	3%	0	-	0	-
parallel to floor	1	3%	0	-	0	-
control airflow	1	3%	1	5%	0	-
flexibility	1	3%	1	5%	4	12%
correct placement	1	3%	1	5%	0	-
support larger air column	0	-	1	5%	0	-
drop to breathe	0	-	1	5%	0	-

vibrato	0	-	0	-	12	35%
control tone	0	-	0	-	8	24%
intonation	0	-	0	-	3	9%
support corners	0	-	0	-	1	3%
complete seal	0	-	0	-	1	3%
firm	0	-	0	-	1	3%

Note. Some participants indicated multiple responses.

Appendix D: Voicing

Table D1

Soprano clarinet voicing syllable variability and choice (N = 39)

	Overall	**% Overall**	Primary CL	% Primary CL (*n* = 32)	Primary BCL	% Primary BCL (*n* = 2)	Primary SX	% Primary SX (*n* = 5)
Consistent syllable	**14**	**36%**	13	41%	0	0%	1	20%
Variable syllable	**25**	**64%**	19	59%	2	100%	4	80%
Syllable:								
ee/high tongue	**19**	**49%**	16	50%	1	50%	2	40%
subtle adjustments	**9**	**23%**	7	22%	1	50%	0	0%
French eu (as in deux)	**7**	**18%**	7	22%	0	0%	0	0%
ah low/ee high	**3**	**8%**	1	3%	0	0%	2	40%
intuitive	**3**	**8%**	2	6%	1	50%	0	0%
ew low/ee high	**2**	**5%**	2	6%	0	0%	0	0%
ee/ü	**1**	**3%**	1	3%	0	0%	0	0%
ee/ö	**1**	**3%**	1	3%	0	0%	0	0%
ö	**1**	**3%**	1	3%	0	0%	0	0%
eh low/ee high	**1**	**3%**	0	0%	0	0%	1	20%
higher tongue for less resistant notes	**1**	**3%**	1	3%	0	0%	0	0%
variable, unspecified	**1**	**3%**	1	3%	0	0%	0	0%

Note. Some participants indicated multiple responses.

Table D2

Bass clarinet voicing syllable variability and choice (N = 22)

	Overall	**% Overall**	Primary BCL (*n* = 2)	% Primary BCL	Primary CL (*n* = 18)	% Primary CL	Primary SX (*n* = 2)	% Primary SX
Consistent syllable	**5**	**23%**	1	50%	3	17%	1	50%
Variable syllable	**17**	**77%**	1	50%	15	83%	1	50%
Syllable								
ee/high tongue	**5**	**23%**	2	100%	3	17%	1	50%
lower/more open than clarinet	**5**	**23%**	0	-	4	22%	1	50%
French eu (as in deux)	**3**	**14%**	0	-	3	17%	0	-
ah	**2**	**9%**	0	-	2	11%	0	-
oo	**2**	**9%**	0	-	2	11%	0	-
ah low, ee high	**2**	**9%**	0	-	2	11%	0	-
subtle adjustments	**2**	**9%**	1	50%	1	6%	0	-
individual	**2**	**9%**	0	-	2	11%	0	-
equipment dependent	**2**	**9%**	0	-	2	11%	0	-
eh	**1**	**5%**	0	-	1	6%	0	-
ö low, ee high	**1**	**5%**	0	-	1	6%	0	-
changes across break	**1**	**5%**	0	-	1	6%	0	-
similar to clarinet but exaggerated	**1**	**5%**	0	-	1	6%	0	-

Note. Some participants indicated multiple responses.

Table 3
Alto saxophone voicing syllable variability and choice (N = 34)

	Overall	**% Overall**	Primary SX (*n* = 29)	% Primary SX	Primary CL (*n* = 5)	% Primary CL
Consistent syllable	**2**	**6%**	1	3%	1	20%
Variable syllable	**32**	**94%**	28	97%	4	80%
Syllable						
ah low, ee high	**5**	**15%**	3	10%	2	40%
not a factor in teaching	**3**	**9%**	3	10%	0	-
ee/high tongue	**2**	**6%**	2	7%	0	-
consistent, shaped between ee and ay	**2**	**6%**	2	7%	0	-
oh low, ah middle, ee high	**2**	**6%**	2	7%	0	-
individual	**2**	**6%**	2	7%	0	-
wide variety	**2**	**6%**	2	7%	0	-
ah	**1**	**3%**	1	3%	0	-
eh	**1**	**3%**	1	3%	0	-
French eu (as in deux)	**1**	**3%**	1	3%	0	-
oh	**1**	**3%**	1	3%	0	-
aw low, ee high	**1**	**3%**	1	3%	0	-
aw low, oo high	**1**	**3%**	1	3%	0	-
oo low, ee high	**1**	**3%**	1	3%	0	-
oh low, ah or ee middle to high	**1**	**3%**	1	3%	0	-
oh low, oo middle, ee high	**1**	**3%**	1	3%	0	-
ah low, eh middle, ee high	**1**	**3%**	1	3%	1	20%
ah low, ih middle, ee high	**1**	**3%**	1	3%	0	-
aw low, eh high, ee altissimo	**1**	**3%**	1	3%	0	-
ah low, eh middle, ih high, ee altissimo	**1**	**3%**	1	3%	0	-
eh in high register	**1**	**3%**	1	3%	0	-
warmer vowels low	**1**	**3%**	1	3%	0	-
darker vowels low, brigher vowels high	**1**	**3%**	1	3%	0	-
lower/more open than clarinet	**1**	**3%**	0	-	1	20%
intuitive	**1**	**3%**	1	3%	0	-
subtle adjustments	**1**	**3%**	1	3%	0	-
ah/oh/ooh for intonation	**1**	**3%**	1	3%	0	-
varies ascending or descending	**1**	**3%**	0	-	1	20%

Note. Some participants indicated multiple responses.
Note. No participants who indicated bass clarinet as a primary instrument teach applied alto saxophone.

Table D4

Summary of voicing syllable variability and choice

	CL overall (*n* = 39)	% CL overall	BCL overall (*n* = 22)	% BCL overall	SX overall (*n* = 34)	% SX overall
Consistent syllable	14	36%	5	23%	2	6%
Variable syllable	25	64%	17	77%	32	94%
Syllable						
ee/high tongue	19	49%	6	27%	2	6%
subtle adjustments	9	23%	2	9%	1	3%
French eu (as in deux)	7	18%	3	14%	1	3%
ah low/ee high	3	8%	2	9%	5	15%
intuitive	3	8%	0	-	1	3%
ew low/ee high	2	5%	0	-	0	-
ah	0	-	2	9%	1	3%
eh	0	-	1	5%	1	3%
consistent, shaped between ee and ay	0	-	0	-	2	6%
oh low, ah middle, ee high	0	-	0	-	2	6%
wide variety	0	-	0	-	2	6%
individual	0	-	2	9%	2	6%
lower/more open than clarinet	0	-	5	23%	1	3%
equipment dependent	0	-	2	9%	0	-
not a factor in teaching	0	-	0	-	3	9%

Note. Some participants indicated multiple responses.

Note. Only responses recorded more than once appear in this chart.

Abstract

The purpose of this study is to produce best-practices pedagogical approaches for soprano clarinet, bass clarinet, and alto saxophone, and distinction of differences between the instruments for teachers of multiple woodwind instruments. No prior studies attempt to develop best-practices models through comparisons between multiple artist-teachers of the same instrument. Most woodwind pedagogy resources rely on anecdotal expertise, and works treating multiple instruments often focus on elements perceived to be most universal instead of clarifying differences.

This descriptive study relies on qualitative analysis of survey data solicited from artist-teachers who are employed at the level of professor, associate professor, or assistant professor and teach applied clarinet or applied saxophone at universities within the United States that offer graduate degrees in music, identified through advanced searches in the College Music Society's Directory of Music Faculties. Survey questions addressed the physical approach to the instrument in the areas of embouchure, air support, and voicing. Of 464 invited participants, 65 responded, producing a 14% response rate.

This study reveals considerable transfer of the physical approach between instruments but also specifies important differences valuable for instruction of any single-reed instrument. Results revealed that applied instructors prioritize air support, embouchure, and voicing similarly and show some consensus but greater variety in conceptual approach and vocabulary used to express physical components of performance. These similarities in presentation of the physical approach to the instrument, at least conceptually, indicate a bias in pedagogy toward sameness, reaffirming the purpose of the study but indicating a need for further investigation.