Pipa

Pipa is a plucked stringed instrument, which is lute-shaped with four strings and a fretted soundboard of 30 (or 31) frets. The word “pipa” is made up of two Chinese characters – “琵” “pi” and “琶” “pa”. These two Chinese characters describe how the instrument is played and the sounds it produced: the forward plucking of the string using one’s right hand was termed “pi”, and the backward plucking of the string with the right hand was termed “pa”. The player wears artificial fingernails made of bone, shell of some special nylon, which are bound by surgical tape onto the flesh of his fingers to pluck at the instrument. Its techniques are applied to almost every plucked stringed instrument and its concepts have been borrowed for the reformations of various plucked stringed instruments.

Tuning:
The symbols of Pipa’s four strings are:
x----the forth and thickest string;
三----the third string;
二----the second string;
一----the first and thinnest string.
( )----a free string.

There are various ways of tuning for Pipa. The most common tuning is (form the forth string to first one):
A, d, e, a,
The others tuning can also be:
G, d, e, a;
A, b, e, a;
A, d, a, a;
B, d, e, a;
#A, #d, e, a;
……

You can also create your own tuning for Pipa. The most common tuning is A-d-e-a.

Pipa has a range of A-e3, all semitones can be played.

Techniques and tonal colour:
In Pipa performance, symbols take on a special significance. Unlike most other instruments that have a few symbols, the Pipa’s symbols number in the hundreds. Each symbol defines and explains the technique that is used in the piece. These symbols, which are evolutions of calligraphy, are recognized by all Pipa players.

Numbers beside the note are used to instruct fingerings according to how the piece to be played. Symbols at the bottom of a note tell the performer which string to use.
The symbols involve **string symbols, right hand symbols** and **left hand symbols**.

**String symbols:**
x----the forth and thickest string;
三----the third string;
II----the second string;
I----the first and thinnest string,
( )----the free string.

When scored, the string symbols are written below a note.

**Basic Right hand techniques and symbols:**
1. \ (tan, 弹) and / (tiao, 挑)
   They are the basic right hand techniques of Pipa playing.
   \ (tan, 弹), which is used forefinger to flick one single string outwards from right to left from the player’s viewpoint, producing a single sound. Sound textures vary, depending on how the string is plucked. Sounds can be solid, weak, soft, forceful, loose, tight, gentle, loud, thick and thin among other textures.
   / (tiao, 挑), which is used thumb to pluck one single string from left to right from the player’s viewpoint, producing a single sound. Like \ (tan, 弹), the sound textures of / (tiao, 挑) produced are mainly depending on the way of playing.
   \ and / are always played as a combination technique. They are not only producing single sounds, but also producing tremolo when the playing is fast and continuous.
   Besides producing the single sound, \ and / can not only play one single string, but also play two or three or four strings at the same time with one plucking movement. The same when tremolo is played. Thus, interval \ (shuangtan, 双弹) and // (shuangtiao, 双挑) chord or tone cluster (sao, 扫) or (fu, 拂) is produced. (When notated, sometimes it’s unnecessary to notate the symbols of \ or /, the player will organize the order of playing naturally according to the notes and beats.)
   \ or / can also play arpeggios when it’s played slowly and continuously to pluck from the inner strings to the outer strings one by one or backwards.
   \ and / are played with the outer side of player’s false nail. The inner side of false nails can also produce sounds. It’s similar to guitar’s playing. The pluck with the forefinger nail’s inner side is “)” (mo, 抹) and the pluck with the thumb nail’s inner side is “Ｇ” (gou, 勾).
   The combination of \ and / is / (fen, 分), which executed on two different strings to achieve a single sound. The combination of ( and ) is ( ) (zhe, 摭), which executed on two different strings to achieve a single sound. ( ) and / \ can be played alternately and continuously in Moderato speed.

2. 轮 (lun, 轮)
   is the other unique and basic technique of Pipa. Forefinger, middle finger, ring finger and last finger flick outwards from right to left in order, while the thumb picks the string from left to right.
This is a basic cycle of a 倪 (lun, 轮) and the perspective of right and left is from the player’s viewpoint. 倪 (lun, 轮) produces continuous tremolos of varying speeds and sound textures. 倪 can be played as a combination of two or more cycles joined together to produce tremolo for certain beats as more as the composer wants.

倪 can not only play on one single string, but also on two or three of four strings.

Accent or accents (\ or // or * or ) can be added while * is playing. The forefinger or thumb plays \ or // or 扫 or 拨, while the other fingers continue with * on a single string. The * cycle then goes back to normal. This technique is usually used to signify that a loud * is required.

**Basic left hand techniques and symbols:**

As others stringed instruments and lute family instruments, the left hand techniques of Pipa include vibrato, portamento, pizzicato, harmonics and artificial harmonics as well. Besides, the most important, unique and expressive technique of left hand for Pipa is **string-bending**.

The way of string bending is that the player’s left finger presses the string on one fret, then pluck by right hand. With the resonant of the note played by right hand just now, left finger which is pressing the string begin to push inwards or pull outwards along the fret to raise the pitch of the string. The string which is always pressed on the fret by left finger can be also returned to the normal position if needed and the pitch’s returning from higher to original can also be heard if the resonant is enough. The sound is similar to portamento or glissando. However, **string-bending** can only be raised the pitches but not reduce and then returned to original while portamento of glissando can be backwards also.

↗ and ↘ are symbolized for **string-bending**.

**None-musical techniques:**

1. 垂 (pai., 拍)
   The sound is like Bartok pizzicato. There are two ways of playing. One is plucking string with thumb upwards and releases. The other way is picking up string and let is go with thumb and forefinger.

2. 拔 (zhai, 摘)
   Thumb presses against string while the forefinger or middle finger flicks outwards from right to left below the thumb. The sound produced is crisp, like thin metal stick being hit on percussion instruments. With the difference among the strings, pressure and positions, the obscure different pitches will be obtained.

3. 卜 (tan-mian-ban, 弹面板)
   Forefinger or thumb uses surface of nails to hit surface of the board.

4. 垂 (sha, 煞)
   Fingernail of left finger stays under the string while the right hand plays, producing the sound that is not purely musical. The obscure pitches can be changed while left fingernail moves the position.

5. **string-twisting**
   Twisting two, three or four together (possibly the first string under the second or vice versa), and
plucking with the right hand. The sound of **string-twisting** is alike beating cymbals. The different position of left finger can produce obscure pitches also like the other non-musical techniques.

**Erhu**

The two-stringed fiddle is termed “二” “two” and “胡” “fiddle”. Erhu is played with a bow which is trapped in between its two strings. The bow is made of bamboo and horsetail hair. The rosin-lathered horsetail hair’s movement against the strings produces soul-stirring sounds, through left-right bowing actions. The absence of a fingerboard renders Erhu’s pitch more difficult to control when bowing, but at the same time allows the instrument to have greater gradations in pitch and a richer palette of tone colors. With versatile playing techniques, Erhu is often associated with sorrow and is capable of producing sentimental sound and melody.

**Tuning and range:**

The two strings of Erhu are usually tuned a fifth apart, with the inner string tuned to the lower pitch and the outer string tuned to the higher one. Currently, the standard tuning is a1 for the outer string and d1 for the inner string. These pitches are used in almost all Erhu repertoires. However, possible range for the outer string is from d1 to b1, while possible range for the inner string is from g to e1.

Erhu commonly uses the range d1 to d3. Nonetheless, as the instrument hasn’t fingerboard, it can reach screeching pitches of up to d4.

The most effective range of Erhu is universally considered to be from d1 to e3. Melodies composed within this range, it allows Erhu to produce sounds which are strong in character, clear and exquisite.

Within the range of a2 to d3, Erhu tends to become much softer. The volume of sound is much weaker. Erhu's amplitude decreases with increasing pitch, especially from d3 and above.

![Musical notation](image)

**Techniques and tonal color:**

Bow techniques are the main techniques of right hand. Pressures are applies to the rosin-waxed bow, which is drawn with the use of the fingers and wrist. The thumb is placed on the bamboo stick of the bow, and the middle and ring fingers are positioned on the bow hairs. The fingers pull at the bow with the fluid motion of the wrist and forearm in order to play.

The bow hairs, trapped between the two strings, are bowed with smooth left and right bowing movements.

Like the western stringed instruments that have upward and downward bowing, Erhu has pull bowing and push bowing. Pull bowing is scored with a “Π” above the note, and push bowing with a “∨” above the note.

In every bowed stringed piece, the design of a bowing method will be scored exactly. A efficient and methodic design of a bowing method can not only facilitates the coordination between the left and right hands, but also represents the musical interpretation of the composer and also the player.
Below are some most common bowing techniques of Erhu:

1. **separate bowing**
Separate bowing is the use of one bowing movement for a single note. Notes produced by separate bowing technique are clear and precise, regardless of speed. Stronger notes are produced using the full extent of the bow in one clean sweep. Separated bowing is the most basic technique of Erhu and is often considered the most important as well. The left and right hands require good coordination and must complement each other.

2. **fast bowing**
Fast bowing is the fast version of separate bowing. Fast bowing ensures a rapid playing of notes to produce detached sounds. It is often used for semi-quavers in scores.

3. **slurred/legato bowing**
Slurred/legato bowing is the playing of two or more notes using a single pull of the bow. It is scored with a slur line “⌒” on top of the notes. Good slurred/legato bowing, as with the violin, requires consistent and fluid movements, especially during the movement of the bow. The number of notes that can be played in one bowing depends on the piece’s volume and speed. The lower the volume, the greater the number of notes can be played in one bowing.

4. **spiccato**
Spiccato is one technique of the bow bouncing on the strings, with one note per bounce. This technique applies generally to the outer string and is continuous in nature. The note produced are short and often used to express light-hearted emotion and happiness, this technique is scored with a “•” above the note.

5. **stamp bowing**
One short and detached note is produced by stamping the bow. Unlike the spiccato, stamp bowing hasn’t bounce and is scored with a “▼” sign above the note. Numerous stamp bowing sounds within a single bowing action can be capable to produce by stamping the bow continuously with intermittent releases of tension while bowing.

6. **tremolo**
Tremolos are played using the wrists and arms in trembling motions to play the same note at fast speeds using the tip of the bow. The position of the bow when this technique is played, must be beyond the bow’s middle, towards its tail. Notes produced by this technique are usually weak.

7. **pizzicato**
Pizzicatos can be played by both of right hand and left hand. For right hand, fingers plucks at the strings. Compared to western bowed stringed instruments, Erhu’s pizzicatos is short and dry-sounding, with free strings producing the clearest sounds. Like the western bowed stringed instruments, right hand’s pizzicato is scored with “pizz” above the note and “arco” when bowing is required. For left hand, pizzicatos usually played on free strings and scored with a “+” above the note.

8. **double stops**
Double stops can also be done on Erhu in the form of perfect fifths. The instrument’s strings can’t be separated when the double stops are in progression. This technique requires the pushing of the bow hairs downwards, allowing the hairs to cover a greater area to play both strings simultaneously. As the space between Erhu’s two strings is extremely narrow, the left fingers can only press at one point on both strings.

9. **bow-twisting**
Metallic scratchy sounds can also be produced by twisting Erhu’s bow and using its bamboo spine to bow at the strings. The sound is dissonant and mostly used in contemporary repertoire. Other contemporary sounds include intentionally lifting the bow towards the middle of the strings and bowing. The sound produced by such a technique is rough and tense.

10. **left hand techniques**

The left hand techniques of Erhu are similar to any western bowed stringed instruments, which are vibratos, portamentos, trills, and harmonics etc.
Sheng
Sheng, a multi-reed mouth organ, is one of the oldest Chinese reed wind instruments. It uses the vibration of bronze reeds attached to bamboo pipes to create sound. Sheng has many different types in different areas, with different numbers of reed pipes.

Tuning:

Technique and tonal color:
Unlike the other instruments, Sheng’s tonal color is very much dependent on the instrument itself. The quality of materials and craftsmanship of the instrument will determine how the instrument will sound. Sheng’s pitches are usually split into three regions ---- high, notes a2 and above, middle, notes between a1 to a2, and low, notes a1 and below. The high regions have been described as well defined, the middle regions are rich and strong, and the lower regions as soft and delicate.

Breathing
The breathing techniques used to play Sheng are unique due to the make-up of the reeds. As such, Sheng can be played through sucking or blowing. When blowing on Sheng with the aim of playing on just one bamboo pipe, it is inevitable that air will escape through the other pipes of the instrument. For this reason, a lot of air is required, and an amateur player might find it tiring to play the instrument.
Recent improvements in Sheng claim to allow air to escape only from the reed pipe that is being played, consequently reducing the loss of air and prolonging the span of time one can play a note. However such improvements haven’t yet to be fully ascertained. It is known facts that the better the instrument, the fewer gaps that allow air to escape.
Sheng playing requires a certain amount of blowing force from the player to be able to vibrate its reeds. It is noted that the higher the note, the greater the amount of force required.
Due to its construction, Sheng’s volume is imbalanced, with the volume of the middle to lower notes usually sounding louder than those of the higher notes.
In recent years, Sheng’s higher registers have been fixed with amplification pipes, to moderate the instrument’s volume.
Advancements in both the instrument-making and its playing techniques have allowed changes in volume (generally p-f), as well as crescendos or diminuendos to be played on chords.
Techniques employed by Sheng can be split in finger techniques and mouth techniques. Both of them are not mutually exclusive.

Finger techniques
Finger techniques encompass the pressing of levers, covering of holes and the use of different fingerings to produce different sound effects.
1. chords and polyphony

Chords have always been an important and integral part of Sheng playing as they are associated with Sheng’s character. The arrangement of reed pipes in the traditional Sheng is perfectly suited to play traditional harmonies. Traditional chords mainly are thirds, fourths or fifths lower or higher from root notes.

Due to emphasis on chord training among Sheng players, some traditional players may feel that it’s easier to play chords than to single notes.

Previously, Sheng work possessed only a skeletal melody and players would often embellish in the form of chords, harmonizing the skeletal melody according to their personal habit. Recently, non-traditional chords have been introduced to Sheng and the practice of writing out all notes in a chord began.

Chords usually comprise three or four notes on Sheng. Recently, it’s able to play chords of up to six notes. On the traditional Sheng, it’s difficult to make a clear definition of what chords can be played due to the non-uniform nature of the reed pipe arrangement.

Among Chinese wind instruments, polyphony is native only to Sheng, and the instrument’s nature renders it capable of being a powerful solo and accompanying instrument.

Composers often like to use ornamental trills like acciaccatura and mordent to be played alongside harmonies.

Counterpoint is becoming more common among Sheng’s recent repertoires, and it has become common for main melodies to be played among the lower registers and for accompaniments to be played on the higher registers of the instrument.

2. Single note

It’s rare for single note to be used in folk music as the traditional Sheng has always been a chord-centered instrument. Afterward, it was discovered and improved that different single notes can be joined together to form Sheng’s first arpeggios.

3. portamento

For Sheng, gliding is the gradual closing up or opening of a playing hole while blowing the instrument. Coupled with the control of breathing and fingering techniques, a Sheng player can play a upward glide and a downward glide as well. Notes are usually glided a third higher or lower. The higher the note, the easier it is to glide. Notes above a2 exhibit a clear portamento. However, although the lower registers are able to utilize gliding techniques, there is usually little or no sound emitted.

Mouth techniques

Mouth techniques have two aims—to create different sound textures using breath and to beautify a sound.

To achieve the former aim, Sheng creates different sound textures through different variations of breath. Sheng’s most common breath techniques include plain playing, light breaths and heavy breaths. The different breath techniques are usually left to the discretion of the player according to the piece being played.

Tonguing is also utilized on Sheng, including single tonguing, double tonguing and triple tonguing. It’s acknowledged that tonguing on Sheng requires a greater force that other wind instruments and it’s easier to tongue repeatedly on Sheng than to tongue running notes. Tonguing on Sheng is used to mimic the sound of drums, footsteps, cymbals and even plucked stringed instruments.
1. **flutter tonguing (huashe, 花舌)**
   Like flute, flutter tonguing (huashe, 花舌) on Sheng uses the vibration of the tip of the tongue and the throat to induce continuous columns of air to produce rapid spurts of breath.

2. **Hushe(呼舌)**
   Hushe(呼舌), loosely translated means “to and fro air”, is a difficult and very unique technique on Sheng. As the nose breathes, the back of the tongue will move back and forth, creating a constant air column between the reed and the mouth that will make the reed vibrate, hence producing a gentle tidal sound. The sound produced in this manner is usually not loud. This technique is scored with the words “hushe” above the note.

3. **houshe(喉舌)**
   Houshe(喉舌) utilizes the columns of air that is forced out by the vibrations caused by the throat. This technique is scored with the word “houshe” above the note.

4. **vibrato**
   There are various sub-techniques to vibrato that use the diaphragm, throat ad tongue to vibrate a played note to different extents.
Zheng

Zheng, with a generic term for a long plucked boxed zither, is an ancient reformed instrument. It’s fitted with strings of different lengths and thickness that are drawn across the long and boxed-like body of the instrument. The end of the string is bound to axles found at the extreme right of the instrument. Different pitches will be obtained by adjusting the tension which created by propping the strings using bridges. Thus, the bridge acts as a pivot for the string to be tuned to a desired pitch. The desired pitch is created on the right of the string (found at the right side of the pivot) by moving the bridges toward the left or right of the body of the instrument. As such, the string towards the right of the instrument and past the bridge is pitched and plucked by the fingers of the right hand. The player wears artificial fingernails made of bone, shell of some special nylon, which are bound by surgical tape onto the flesh of his fingers to pluck at the instrument.

The left of Zheng (or the side left of the bridge) is un-tuned and provides a space for the player to press at using the fore, middle and ring fingers of the left hand. Portamento effects are created by bending the left side of the instrument while the right hand plucks at the pitched side of the string. Glissandos can also be achieved on the left side of the strings, producing strange and non-musical sweeping sounds-- a result of playing a series of unfixed pitches. Fingernails are also worn on the left hand as they are sometimes used to aid the plucking of the pitched sides of the strings. This is especially seen in arpeggios performed on Zheng.

Zheng can’t shift between key changes effectively as it commands a fixed scale. Instead, players must shift the bridges propping up the strings in order to change the pitches of the various strings, effectively re-tuning their instruments whenever there are changes in keys.

The number of strings, tuning structures, types of strings and playing techniques vary from region to region in China. Here we’re introducing the most popular form of Zheng which is 21-stringed Zheng.

The range of a standard 21-stringed Zheng is D—d3. The strings of the standard 21 stringed Zheng correspond to the pentatonic scale. Each string produces a single pitch when played. Due to the pentatonic nature of the instrument, a player is required to use his left hand to press on the “mi” (mediant) and “la” (submediant) strings respectively to obtain the “fa” (subdominant note) and “si” (leading note) of a scale, bending the pitch of the string to obtain the required semitone. The bending of pitches can be done on all other strings, allowing portamentos to result from any of the fixed-pitched strings. The bending of pitches has since become an integral part of Zheng technique which are epitomized in folk repertoires.

However, progressive Zheng pieces do not follow the Zheng’s pentatonic scale rigidly, with many scores altering the tuning structure of the instrument. The specifics tuning scale of the piece should be notated in the score.

Techniques and tonal color
The lower ranges (D--a) of the 21-stringed Zheng produce sounds that have been described as full of depth, while the middle ranges (a—d2) which are the most commonly used are bright, clear and graceful. The higher note regions (d2—d3) produce clear and crisp sounds.

Zheng mainly uses the right hand’s thumb, fore, middle and ring fingers to play. When fitted with artificial fingernails, plucking at the instrument produces solid, clear and crisp sounds. Different plucking positions of the right hand produce different type of sounds. Generally speaking, sounds produced near the area where is at the extreme right of the instrument are bright and crisp. Sounds produced nearer to the bridge are soft and gentle.

Recent compositions for Zheng emphasize the left hand, which in traditional repertoire is seldom used to pluck the strings as it was used purely for pitch-bending. As the left hand is becoming more independent, nails are sometimes worn on the left hand. Left hand is capable of playing melodies and even counterpoint, in the form of chords, rhythms, arpeggios and glissandos. It harmonizes and effectively compliments the right hand. The left hand has become essential in large arpeggios and is used for glissandos.

Zheng’s techniques can be classified into **plucking techniques** and **string-pressing techniques**. Although usually achieved with the right hand, the **plucking techniques** can also be applied to the left hand as well. **String-pressing techniques** are performed by the left hand.

**Glissandos:**
Glissandos are an important part of Zheng’s repertoire. The speed and range of glissandos are according to the characteristics of Zheng’s melody. There are generally two different kinds of glissandos: one is decorative, and the other is melodic. In a decorative glissando, the melody line is not changed. The glissando becomes an ornament for the basic melody line, glamorizing it. The glissando fills in gaps of sound formed in a melody. Thus, it don’t affect the melody’s tempo and rhythm. Such glissandos are usually short and fast, spanning over a small range of notes. The melodic glissando, in every sense of the word, demands large sweepings of strings that form the main melody of a piece. In this case, the glissandos themselves are the melody and form the phrase.

**Pucking techniques:**
As mentioned, playing Zheng requires the use of artificial fingernails like Pipa playing. However, the difference between them is that the artificial fingernails are worn on top of the Pipa player’s actual fingernails; while Zheng’s nails are worn on the fingertips as playing is effected through inward movements of the fingertips.

The thumb, forefinger, middle finger and ring finger of right hand are used to pluck the strings. The forefinger, middle finger and ring finger usually pluck in the direction toward the player, while the thumb plucks in the direction away from the player.

Both Pipa and Zheng use surgical tape to bind the nails to the player’s fingers and have an extravagant use of symbols to represent various **plucking techniques**:

→ (pi, 劈), the thumb plucks the strings in the direction towards the player in one movement.
← (tuo, 托), the thumb plucks the strings in the direction away from the player in one movement.
\ (mo, 抹), the forefinger plucks the strings in the direction towards the player in one movement.
/ (tiao, 挑), the forefinger plucks the strings in the direction away from the player in one movement.
⌒ (gou, 勾), the middle finger plucks the strings in the direction towards the player in one movement.
∪ (ti, 剔), the middle finger plucks the strings in the direction away from the player in one movement.
ク (ti, 提), the ring finger plucks the strings in the direction towards the direction of the player in one movement.

The above techniques are all scored above the note. Techniques from the different fingers can be combined together to play chords. For example, ┐(tuo, 托) and ∪ (ti, 剔) can be effected together, with the thumb exercising ┐(tuo, 托) on one string, while the middle finger plucks using the ∪ (ti, 剔) on another string. Similarly, ∪ (ti, 剔) and ⌒ (gou, 勾), \ (mo, 抹) and / (tiao, 挑), ┐ (pi, 劈) and ┐ (tuo, 托), being techniques of the same finger, can’t be done simultaneously.
The thumb and forefinger can play tremolos.

String-pressing techniques:
Besides plucking strings, the left hand is most responsible for portamentos. These bends in pitch are characteristics of the instrument and can be easily played on Zheng. The fingertips add pressure to the left side of the string, depressing it to various magnitudes to produce various inflections of sound. Every string can produce a note up to a third higher from the string’s tuned note when the string is depressed on the left side of the bridge. As the instrument’s lower regions have thicker strings, a performer will have to exert more force in bending the pitch of the strings. So, lower strings can usually produce portamentos that are of a second higher than the string’s tuned pitch. Due to Zheng’s pentatonic nature, bending pitches are the means to produce the “fa” and “si” of a scale. Similarly, other semitones are produced by bending pitches as well. Despite its need for a bend, Zheng doesn’t require special scoring of a semitone.

Vibratos are very easy to play with string-pressing.
Zheng’s harmonics are played by using the left hand to gently tap at half the length of the pitched string, while the right hand strikes at the string simultaneously. Harmonics can only be performed on tuned free strings. In Zheng’s repertories, harmonics occur mostly between the region of A to a1.

Chords:
Chords can be played on Zheng, with up to eight notes being played simultaneously. However, due to its pentatonic nature, chords containing five to eight notes must all be played on free strings. If a string is required to be depressed (to achieve a note that can only to be produced while a string is depressed), a chord produced by the right hand can accommodate a maximum of only four notes. Arpeggios, on the other hand, can run continuously.
Following is the links of these four instruments’ demonstration video and performance video as well:

1. Pipa:
http://www.youtube.com/watch?v=N4j4B15IQ7g&feature=related

2. Erhu:
http://www.youtube.com/watch?v=i8Q8aZ1paUw&feature=related

3. Zheng:
http://www.youtube.com/watch?v=WyJVN2hWMWc&feature=related

4. Sheng music of different style:
   a) concerto with western orchestra
http://www.youtube.com/watch?v=FUpObkeaCTA&feature=related

   b) solo composition with traditional style
http://www.youtube.com/watch?v=gXXtZ7FAYOc&feature=related

   c) solo piece with contemporary style
http://www.youtube.com/watch?v=BezbeB9jPU&feature=related